July 2, 1945

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

ECHNOLOGY DEPT.

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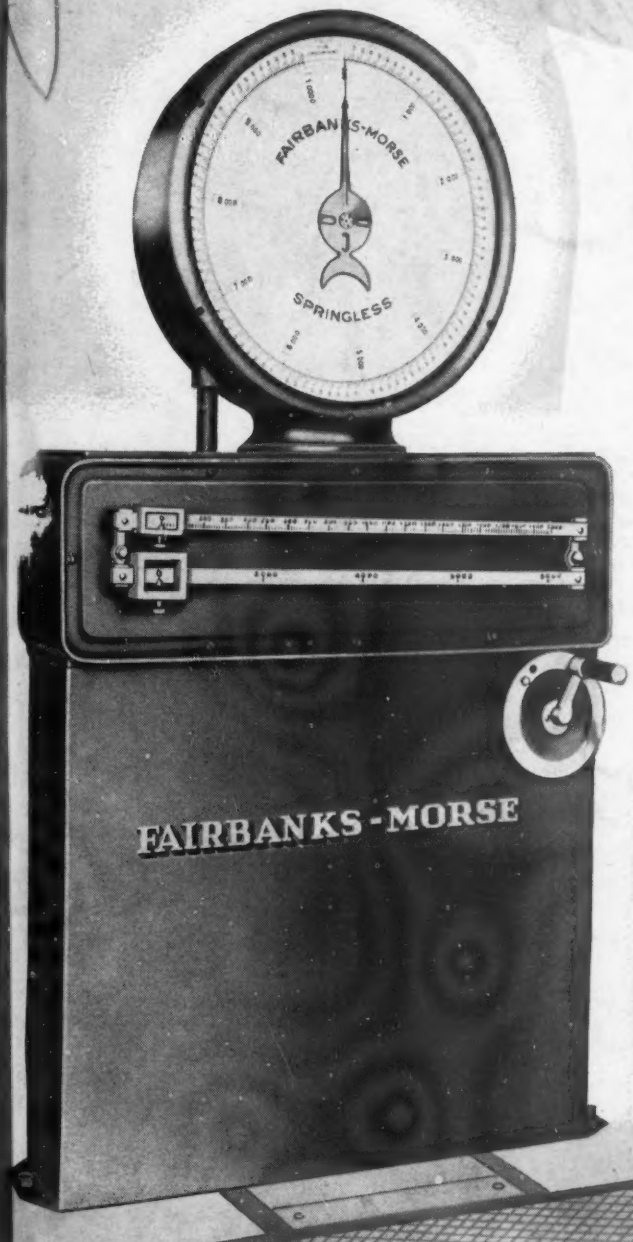

Scales That Do *Plus* Jobs for Industry

For considerably more than a century, Fairbanks-Morse Scales have been famed for providing lastingly accurate weighing.

Now they perform many "plus" services. They *count* parts and products, weigh while materials are *moving*, *read* themselves and *print* weight records, weigh and disburse preset amounts *automatically*, and guard secret formulas.

Fairbanks, Morse & Co., Chicago 5, Illinois

Buy War Bonds

Fairbanks-Morse

A name worth remembering

FAIRBANKS MORSE

Diesel Locomotives • Diesel Engines • Generators • Motors • Pumps • Scales
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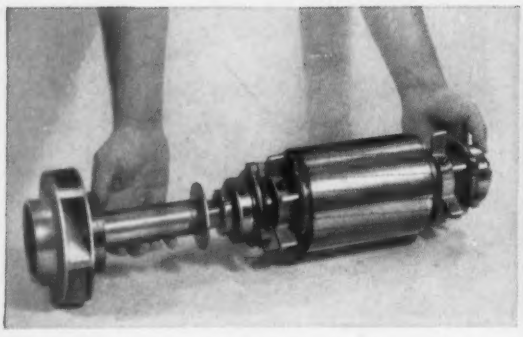
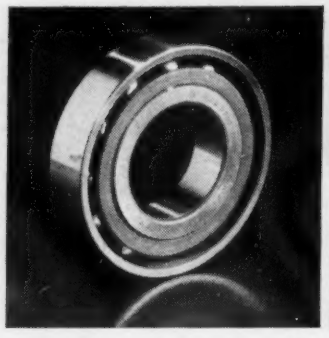
[PUMP TIPS FROM ALLIS-CHALMERS—ONE IN A SERIES]

How to make CENTRIFUGAL PUMPS *Last Longer...*

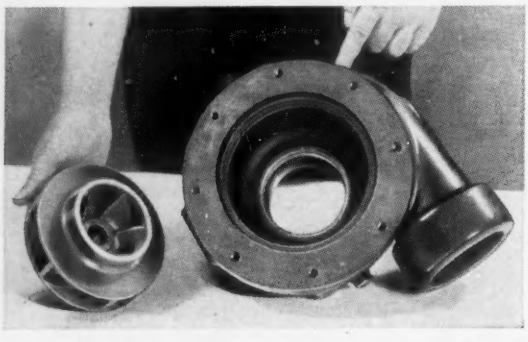




1 WHEN YOU HAVE an A-C "Electrifugal" pump you don't have alignment problems, for *both* impeller and rotor are mounted on *one* shaft. However, most pumps are coupled to separate motors . . . and how well the two are kept in alignment has a lot to do with how long they last. For timely help, get your *free* copy of Allis-Chalmers' "Handbook for Wartime Care of Centrifugal Pumps".

2 ALL BEARINGS AREN'T ALIKE. For example, while too much lubricant won't harm sleeve bearings, in anti-friction bearings it *promotes* friction. So play safe . use only the *right* amount of the *right* lubricant — as recommended by your manufacturer.

3 SLEEVES WEAR UNDULY when water seal piping is plugged, lantern ring displaced, water is dirty or stuffing box gland is drawn too tightly. By keeping a constant check on such sources of wear, sleeve life can be materially lengthened. For valuable tips on how to locate, how to remedy these and other pump troubles, consult the "Handbook".



4 THE KIND OF PACKING, and *how* you use it have a lot to do with how long your pumps last. Commonest cause of trouble traces back to lack of "know-how" in caring for stuffing boxes. A quick picture of the *how* and *why* of efficient packing can be found in the "Handbook".

5 AN OFTEN OVERLOOKED CAUSE of impeller and casing wear is cavitation. For if a pump's capacity, head and particularly, suction lift aren't figured properly, this enemy can eat vital parts away fast. Allis-Chalmers' "Handbook for Wartime Care of Centrifugal Pumps" contains a step-by-step method for figuring head, plus tables of losses to help you apply your pumps correctly.

TODAY, with pumps working harder than ever and replacements difficult to obtain, you can't afford to take chances on maintenance. That's why Allis-Chalmers has published its "Handbook for Wartime Care of Centrifugal Pumps".

Write for your *free* copy of this valuable book today! It applies to *all* makes of pumps; contains *no* advertising.

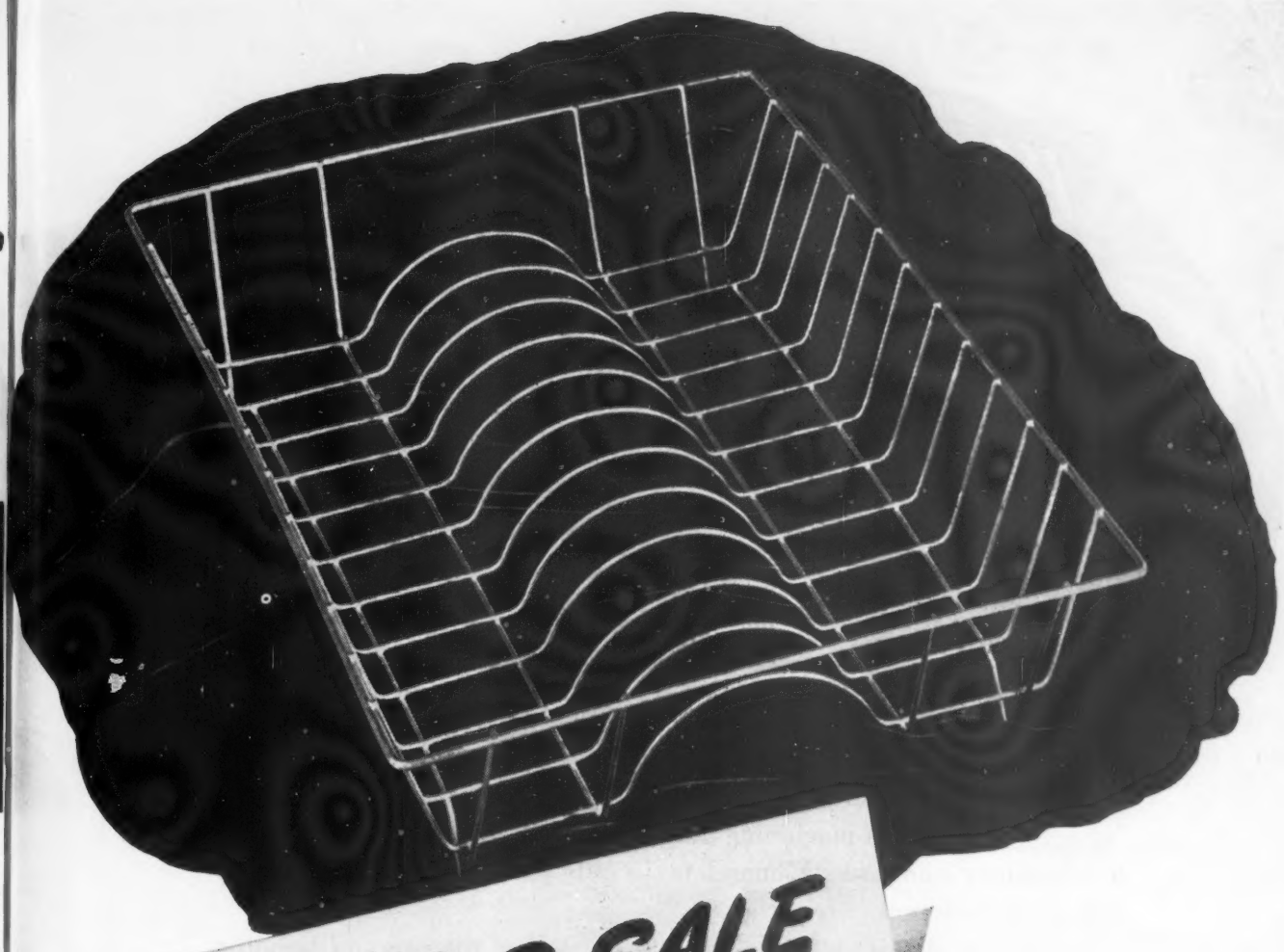
And when you *do* need new pumps, look into the extra efficiency of A-C centrifugal pumps . . . the "Electrifugal", and all types for every purpose. ALLIS-CHALMERS, MILWAUKEE.

A 1776

ALLIS-CHALMERS PUMPS

Allis-Chalmers builds all types and variations of pumps shown at right. Capacities from 10 to 150,000 gpm—heads to 2500 lbs.

Single Suction | Double Suction | Double Suction Multi-Stage | Open Impeller | Mixed Flow | Axial Flow (Propeller)



NOT FOR SALE

A simple contrivance, made from a few feet of heavy-gauge steel wire, but it's dear to the heart of the housewife. It is hard to think of any household gadget that's a bigger convenience in running a kitchen than the ordinary dish rack.

Not long ago dish racks were taken for granted, like potato mashers, refrigerator baskets, coat hangers, and dozens of other inexpensive convenience devices made of steel wire. The stores were full of them. Today they are made either in extremely limited quantities or not at all.

Steel wire, for all its many uses in everyday living, has even wider uses in war. That is why direct war applications and essential uses at home are requiring all—and more—wire than we can produce.

We appreciate the understanding and forbearance our wire customers have shown throughout the war emergency. And this much we recognize: the larger the quantities of wire that are applied to the winning of the war, the sooner will come the day when Bethlehem rods and wire will be available for normal peacetime uses.

Bethlehem Steel Company, Bethlehem, Pa.
Bethlehem Steel Export Corporation • New York City

BETHLEHEM WIRE ★ BETHLEHEM STEEL ★

We had to be GOOD to build this A

Weighing only 40 pounds, this compact power take-off unit for British bombers transmits 40 hp. It demands the highest precision machining and assembly of parts processed almost to laboratory standards. Monarch is the only plant in America entrusted with its production.

We've gained this skill in close tolerances over the years of building fine Monarch Lathes. Much of the turning, boring and facing of parts for this power unit is done on our own turning machines, demonstrating their ability to meet the most critical requirements of aircraft production.

This broadening experience gained by our operators will help them build better Monarchs from the improved designs of our engineers. Your new Monarchs will enable you to produce faster, more economically and more accurately than ever before.

See your nearest Monarch representative about present or future turning problems.

THE MONARCH MACHINE TOOL COMPANY · SIDNEY, OHIO

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Phone: Trinity 1-0426

NEWARK 2, NEW JERSEY
635 Industrial Office Bldg.
Phone: Mitchell 2-1770

CLEVELAND 6, OHIO
Room 209 Upper Carnegie Bldg.
10465 Carnegie Avenue
Phone: Garfield 2590

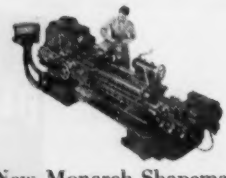
INDIANAPOLIS, INDIANA
Maco Building
38 and College Avenue
Phone: Wabash 2650

PITTSBURGH 22, PENNSYLVANIA
512 Empire Building
Liberty Ave. and Stanwix St.
Phone: Atlantic 6428

Representatives in Principal Cities

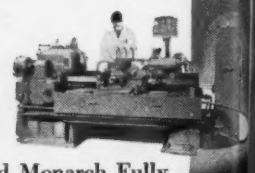
SAVE TIME, MONEY, MATERIALS WITH MONARCH TURNING MACHINES

New Monarch 10" x 20" Sensitive Precision Toolmaker's Lathe.

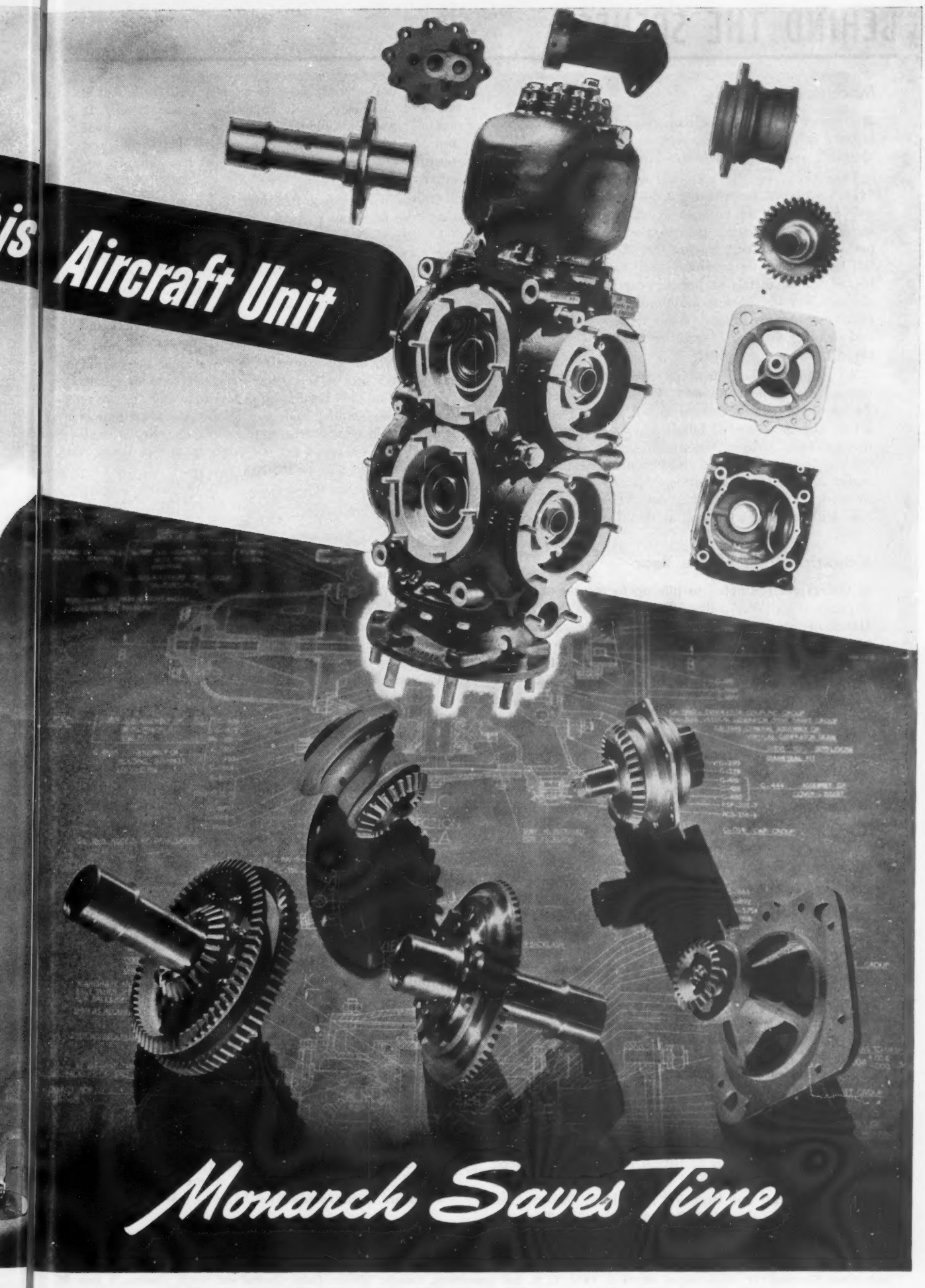


New Monarch Shapemaster Formturning Machine.

One of three types of Monarch's new 10" Hi-Speed Precision Turning Machines.



Improved Monarch Fully Automatic Magnamatic Turning Machine.


Aircraft Unit
Monarch Saves Time

BEHIND THE SCENES

Machine Tool Study

By now you will have had an opportunity to study in some detail the special report on machine tools which appeared in last week's issue.

This study, by the editorial and research staffs of STEEL, is part of a continuing series which began, as you will recall, with an analysis about a year ago of the metalworking industry's general postwar plans and expectations. Following this, in the Metal Show issue of last fall, the editors presented their findings on the expected use of metals in peacetime products. The machine tool study is thus the third in the series and is particularly timely in view of the problems on the proper and efficient disposal of government-owned surplus machine tools.

As a further help in your own planning, STEEL's research department has compiled more detailed breakdowns of the data presented in last week's twelve-page insert, and these special tabulations are available on request. They analyze the study by size of plants, according to seven different employment classifications, by eighteen product or industry groups, and by geographic territories. Also additional copies of the insert are available without charge as long as they last.

Industrial Book of the Year

Orders are beginning to pile up for copies of "Steel Expansion for War", the 200-page report by W. A. Hauck of the Steel Division of WPB, which STEEL has reprinted in its entirety and is making available at $2.00 per copy. Discounts are applicable to quantity orders down to as low as $1.50 for 100 or more copies.

This is an outstanding report, containing 70 pages of excellent photographs and full details on the planning and construction of new steelmaking facilities since the beginning of the war. It has been reprinted and made available by STEEL on a non-profit basis and we urge you to place your order now for immediate delivery. Please address the Book Department, STEEL, Penton Building, Cleveland 13.

Welcome Bob—Welcome Joe

It is with real pleasure that we announce Bob Hartford, Pittsburgh editor of STEEL, is taking up new duties in market research work here in the Cleveland office beginning this week. Bob's many friends in the Smoky City have already wished him a bon voyage and he was last reported heading north under full steam. Newly married Joe Sullivan, who has handled the Cleveland markets and news and at the same time done such an excellent job on The Business Trend, is taking over from Bob, which means that Old Man Par is in for some tough sledding on the Pittsburgh district's golf courses.

Quality Control

In the June 11 issue we ran an interesting article on "Controlling Quality by Statistical Methods" and among other requests for additional tear sheets of the story was the very logical one from W. M. Biklen, Quality Control Engineer of the W. A. Scheaffer Pen Co. That may be, and undoubtedly is, a frequently used title, but it was new and as a result an intriguing one to us. It has more subtle selling in it than any title we've ever run across, and although we've always had the highest regard for Scheaffer pens, our respect has gone up another notch.

Of course, the fact that Mr. Biklen went on to say that "We find your magazine most interesting as well as informative" may have had a little bit to do with it, but then he pours salt in one of our deepest wounds by asking if we have located that super-duper power lawn mower yet. Just between us girls, the answer is "no", although we have run across two or three we could have grabbed off by cashing in all our war bonds and slapping another mortgage on the old homestead.

The truth of the matter is that we have some child labor lined up to keep our monocolyledonous plants (grass to you) cut down more or less regularly and we've sort of been holding back hoping that the lawn mower people would soon start whipping out their postwar models and that we could get our paws on one of them.

Are we hoping in vain?

Grandpa Hassafras

On the way back from the swing we took up through Milwaukee, Fond du Lac, Madison and Rockford previewing the Machine Tool Study with the master tool builders of those cities and in return enjoying their extremely pleasant hospitality, we stopped on the way into Chicago for one of those old-fashioned home-style chicken dinners at a lovely spot called the Shady Lane Farm. Here's how the back of the menu reads, which may give you a further incentive to be sure and stop there if you get within range:

"Grandpa Hassafras immigrated from Inkswat, Penn., 1845, just two hours ahead of the mob. He settled in McHenry County in 1854. It's a matter of record this is the only settlement Grandpa ever made.

"Acquired the present sight of Shady Lane Farm from the Indians by trading home made hooch, made under the covered wagon on moonlight nights. Thereby hangs the traditional tale of why good liquor is always served at the Shady Lane Bar. Lived to the ripe old age of one hundred and died by catching his whiskers in a whiffle tree. Originated many of the quaint sayings of his time which can be heard on any radio program today.

"Anybody wishing to drink a toast to the old man, may make arrangements with the bartender".

And we did, too.

Seeing Double

But although we toasted Grandpa heartily we really didn't have enough to justify what G. Harris Danzberger of Lukens Steel writes:

> **If you can get a slug SHRDLU by running down the first row of keys on your linotype machine, you're better than Ottmar Mergenthaler, inventor of the contraption. Apparently you have re-christened yourself with something stronger than water, and are seeing double.**
>
> SHRDLU

Vol. 116, No. 1, July 2, 1945, issue of STEEL, published every Monday at Cleveland, Ohio. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

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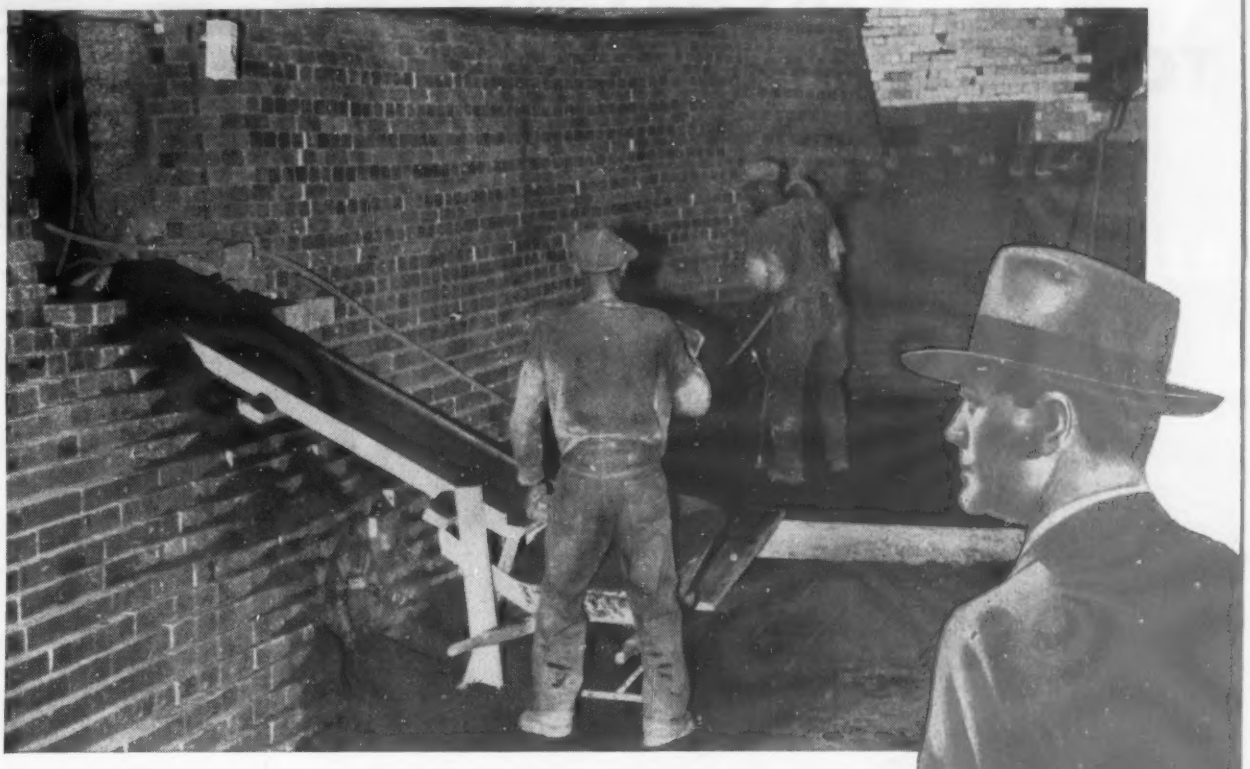


Ramix, the original cold-ramming magnesia refractory, saves time, labor and expense in the construction of new hearths and in major hearth repairs.

"MR. IN-BETWEEN" KEEPS YOU OUT OF TROUBLE

NOW is the time to eliminate the negative, undependable old hearth . . . the bottom that's always piling up too many minutes of delay time and too many dollars of extra refractory expense.

The positive step is to call in "Mr. In-Between"... the Basic Sales Engineer. He's the link between our refractories and your furnaces, the man who's there to help you avoid hearth failures.

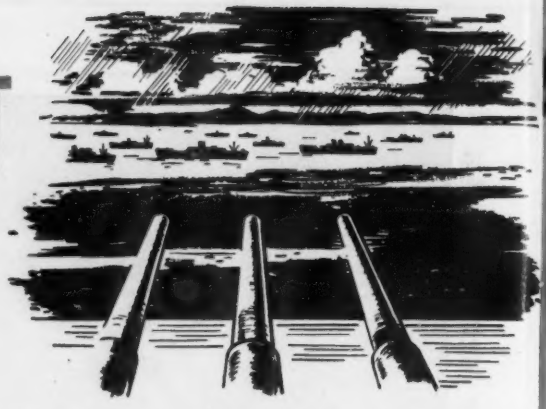
Possibly you need to replace an unreliable old bottom with a new one of Ramix. Perhaps all you need is a major hearth repair. Or maybe a program of periodic resurfacing will bring delay time into line and keep the hearth sound and clean. On almost any refractory problem, you'll find this "Basic" man has good, helpful ideas.

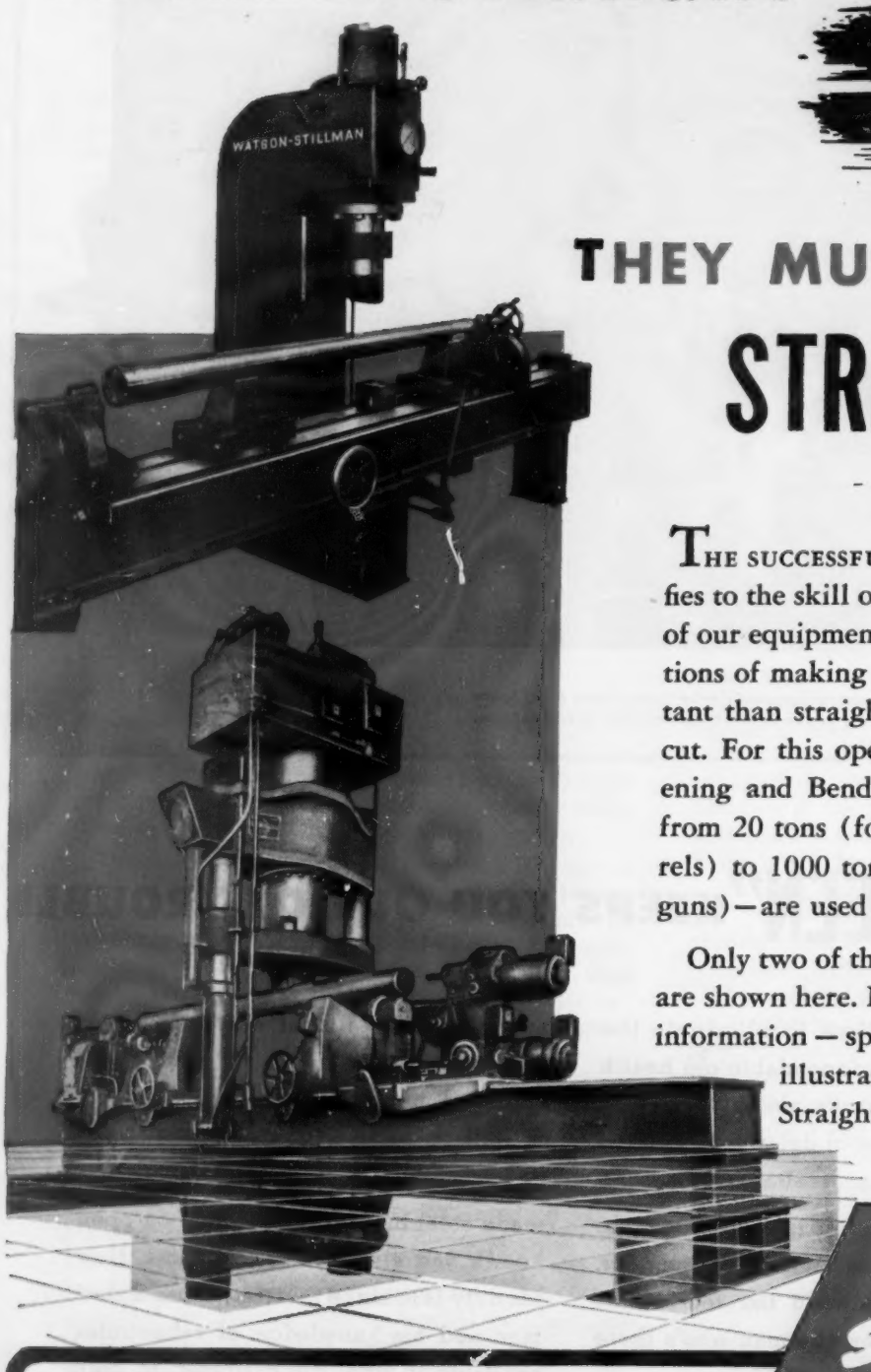
You can depend on the Basic Engineer because he is a practical steel man. He has made steel himself, spent years on open hearth and electric furnace floors. Now his duty is to make this training as a steel man and his knowledge of refractories available to you, his customer, to help you produce steel with minimum refractory trouble and at lowest refractory cost.

So just accentuate this point...the Basic man is YOUR Refractories Engineer. Don't hesitate to use his "know-how" and experience.

BASIC REFRACTORIES, INCORPORATED 845 HANNA BUILDING *Cleveland 15, Ohio*

TO SHOOT STRAIGHT





THEY MUST BE MADE

STRAIGHT

THE SUCCESSFUL record our Navy has made testifies to the skill of our gunners — and the perfection of our equipment. In the various mechanical operations of making a gun barrel, none is more important than straightening — just before the rifling is cut. For this operation, Watson-Stillman Straightening and Bending Presses — ranging in capacity from 20 tons (for straightening machine gun barrels) to 1000 tons (for straightening larger naval guns) — are used with precise results.

Only two of the latest W-S Straightening Presses are shown here. Bulletin No. 320-A gives complete information — specifications, engineering data and illustrations — on the entire line of W-S Straightening and Bending Presses.

4745

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You can drop a Northwest right into your plant layout. Its versatility adapts it at once to your material handling problems. No auxiliary equipment is required. It requires no rearranging of plant layout. Put it in the yard and let it go to work. Route it from job to job. Put it to work handling coal, ashes, scrap, turnings and borings, storeyard work, loading and unloading cars and trucks, on your construction jobs!

It's all in the day's job! You can keep it busy all of the time and you'll wonder how you got along without it. No other type of material handling equipment can do what a Northwest can do. It goes anywhere—out beyond the reach of overhead equipment. Only one man is required for its operation and when the engine stops operating, expense stops.

Take a look at the future of your business and plan now to cut your storeyard costs.

Have you rea the NORTHWES AD Today

BUILT IN A RANGE OF 18 SIZES— 4½ TONS CAPACITY AND LARGER

OTHER THINGS A NORTHWEST WILL DO!

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NORTHWEST

The Crane that goes Anywhere!

Let's get acquainted INVESTIGATE THIS *Different* CRAWLER CRANE

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If you will need low-cost, high-quality

BALL BEARINGS

for products like these . . .

Our plant facilities and experienced manpower belong in *your picture* . . .

They belong in your picture because they will make it possible for you to secure, at low-cost, extremely high quality frictionless bearings for non-precision use. Such bearings will be in greater demand than ever before. For, in many cases, they will provide the answer to the post-war demand for higher performance standards at no increase in product cost.

For years before the war, many leading producers of products, like those illustrated here, relied upon this organization for such bearings. Today, with augmented facilities and enriched experience, we are in a position to design and manufacture practically any type of high-quality, low-cost ball bearing of the semi-precision and non-precision types, radial, thrust or combination.

Let's talk it over . . .

Write for *the Free Booklet on our post-war facilities for the production of piston pins, ball bearings, hardened and ground screw machine parts; and heat treated, hydrogen copper brazed steel stamping or forging assemblies. Burgess-Norton Mfg. Co., 100 Peyton Street, Geneva, Illinois.*

ARMY NAVY

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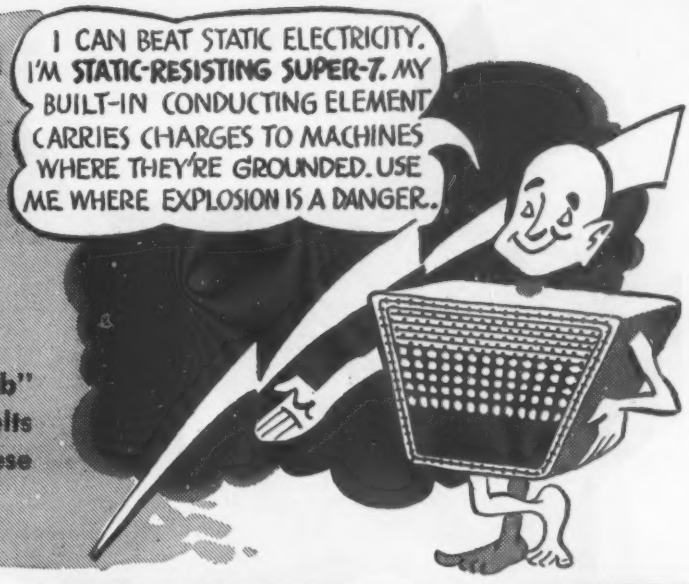
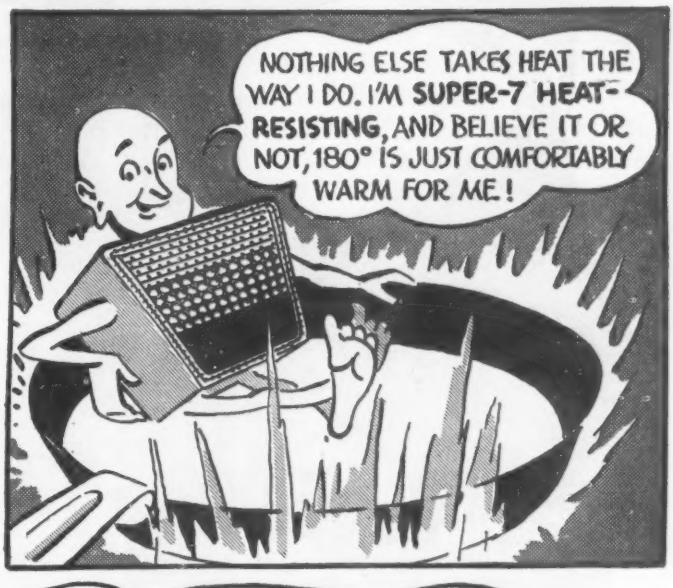
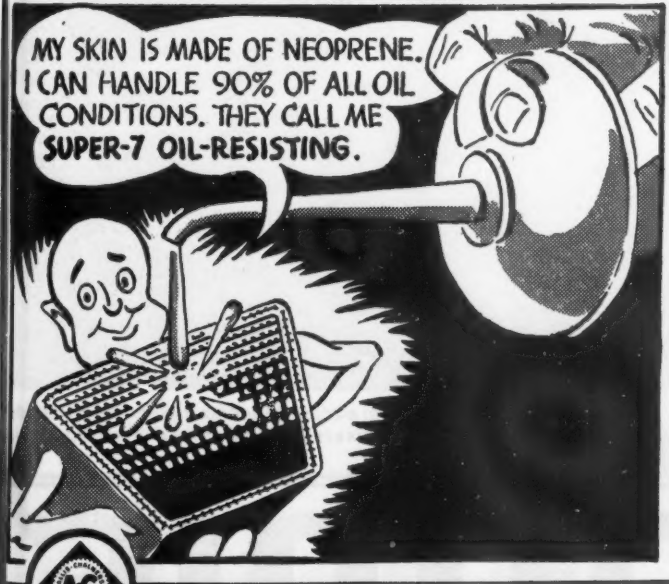
A Part is Never Made Right Unless it is Satisfactory to Our Customer

TALL TALES ...but TRUE!

Their exploits may sound like a "Liars Club" meeting . . . but the great new Texrope V-Belts really do solve each and every one of these various drive problems.


I CAN BEAT STATIC ELECTRICITY. I'M STATIC-RESISTING SUPER-7. MY BUILT-IN CONDUCTING ELEMENT CARRIES CHARGES TO MACHINES WHERE THEY'RE GROUNDED. USE ME WHERE EXPLOSION IS A DANGER.

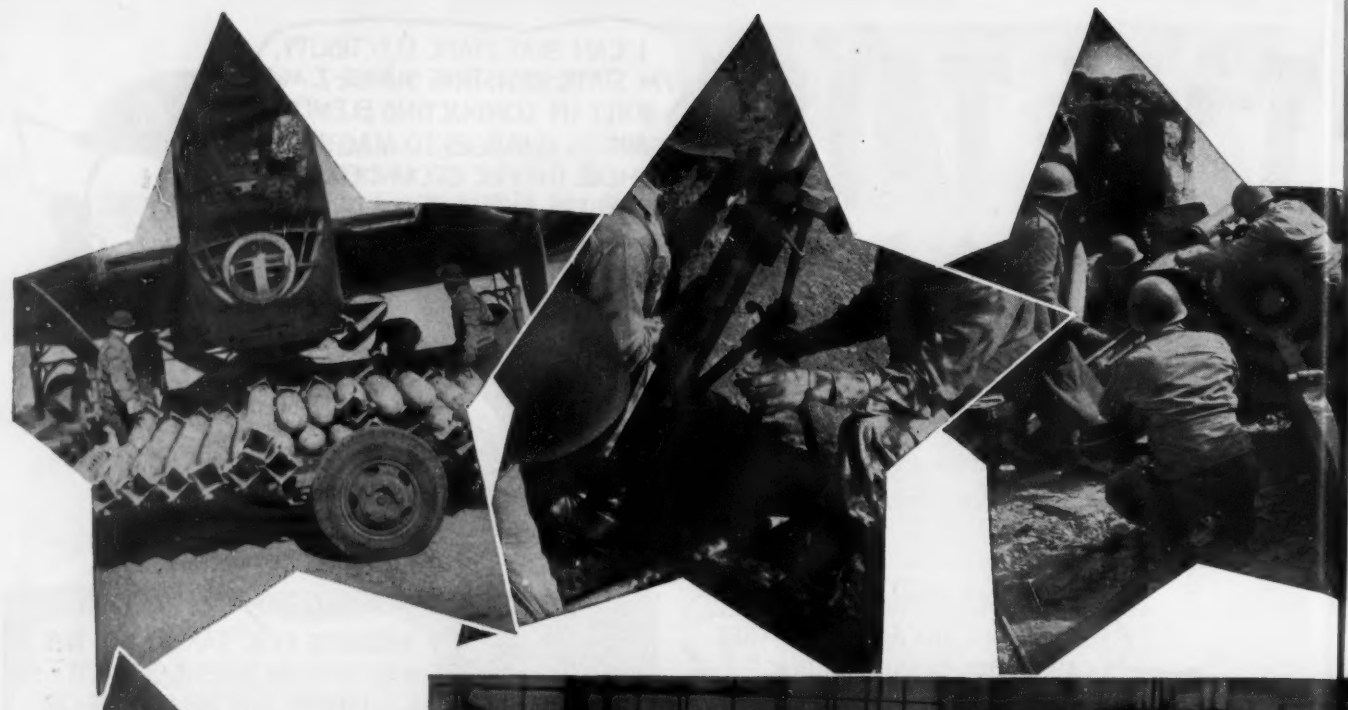




IT PAYS TO MAKE **ALLIS-CHALMERS** YOUR

V-BELT DRIVE HEADQUARTERS

Texrope Super-7 V-Belts result from the cooperative research of two great companies—Allis-Chalmers and B. F. Goodrich—and are sold exclusively by A-C.



The Landmaco Threading Machine threading cartridge Landm
containers for 60 mm trench mortar shell nose e

LANDIS
WAYNESBORO

Serving All Units of Our
ARMED FORCES

Threading operations on shells, aircraft parts, super-bombers, gun carriages, diesel engines for submarines, etc., are being performed with precision accuracy, at maximum speed, by Landis Equipment in plants all over the world.

...tridge Landmaco Shell Tapper tapping ... shell ... nose end of 75 mm shells.

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Helping Reduce Costs

Where you find a Buffalo Billet Shear in a forge shop—you know that billet preparation costs are LOW! Cutting steel for forging 24 hours a day Buffalo Billet Shears are contributing greatly to American war production.

They will make equally impressive savings for peace time manufacturing.

Bulletin 3295 gives details.

BUFFALO FORGE COMPANY
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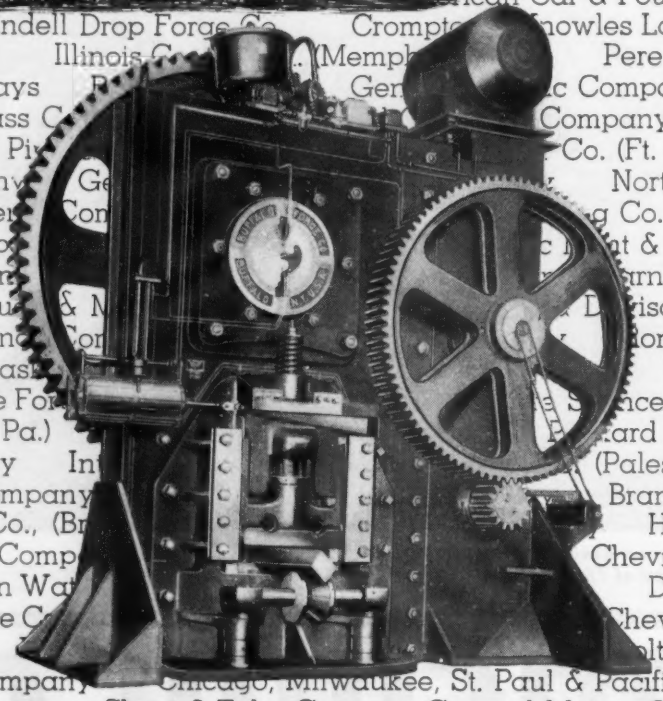

"Buffalo" **BILLET SHEARS**

GREATER STRENGTH IN STRUCTURALS FOR HEAVY-DUTY APPLICATIONS

N-A-X High-Tensile Steel is the answer to many design problems where the *great strength of this fine-grained steel* can be applied to reducing weight, increasing durability, or both. Produced by Weirton in structural shapes and special sections, N-A-X High-Tensile Steel provides high strength and impact values, excellent weldability, exceptional resistance to fatigue. Corrosion-resistance is four times that of mild carbon steels.

N-A-X
HIGH-TENSILE STEEL

ITS FINER GRAIN MAKES ALL THE DIFFERENCE

N-A-X High-Tensile Steel center sills and other car shapes provide more rugged construction for railroad cars. . . . With greater proven resistance to fatigue and impact at the wide range of temperatures at which this equipment operates, N-A-X High-Tensile Steel assures longer life with less maintenance cost.

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WEIRTON, WEST VIRGINIA • SALES OFFICES IN PRINCIPAL CITIES

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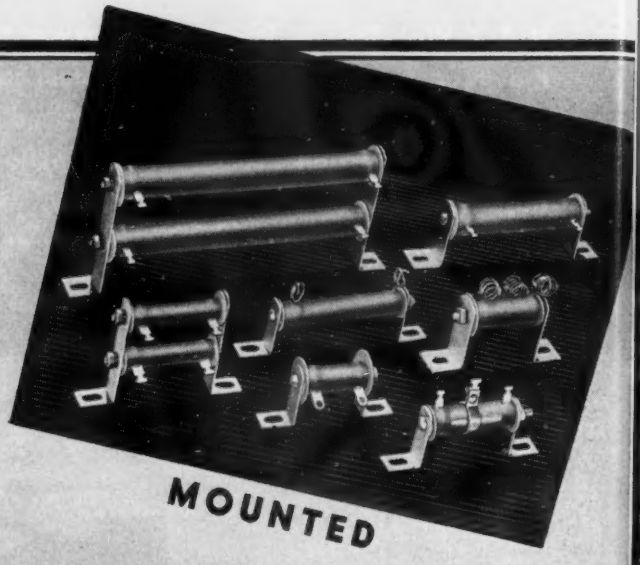
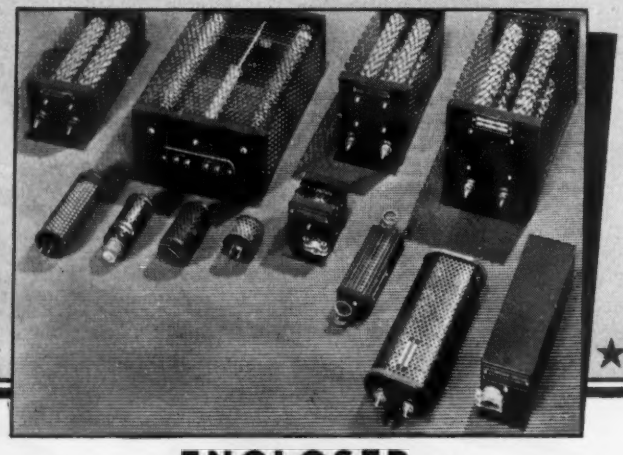
RESISTORS

UNMOUNTED



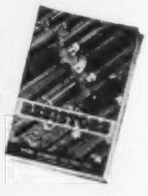
MOUNTED



ENCLOSED

THE LINE of Ward Leonard Wire Wound Resistors has been developed through over half a century of meeting the requirements of the electric and electronic industries. The line, therefore, is complete. Ward Leonard not only offers wire wound resistors of every type, size and watt rating, but also resistor asssemblies for usual and unusual purposes. You can find exactly the resistors you are looking for at Ward Leonard.

Send for the New Resistor Handbook. It describes the entire line giving full data on enclosures, mountings, terminals and resistance values.



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Checker-Coat is a popular sheet, well known for its distinctive spangle pattern in checkered blocks. It adds smartness to sheet metal work and manufactured products. The base metal is the same high quality open hearth steel used in SUPERIOR galvanized sheets. It is highly workable and uniform. Use Checker-Coat where appearance counts.
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STEEL SHEETS AND WIRE
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● For the convenience of manufacturers, Continental Steel Corporation has published an informative new booklet . . . a brief, but complete, guide to the many steel products produced for manufacturers by Continental. Illustrated and described are many kinds of coated steel sheets, wire in a vast variety of specifications, steel roofing and siding, and Continental Chain Link fence. You are invited to write for a copy of this new Manufacturers Booklet . . . you will find it a handy source of buying information.

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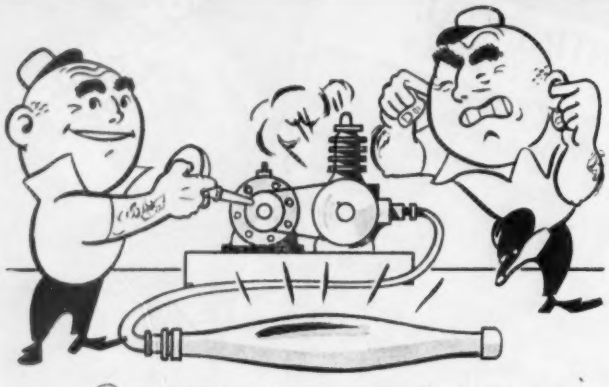
THE SUPERIOR SHEET STEEL COMPANY • CANTON, OHIO — A SUBSIDIARY

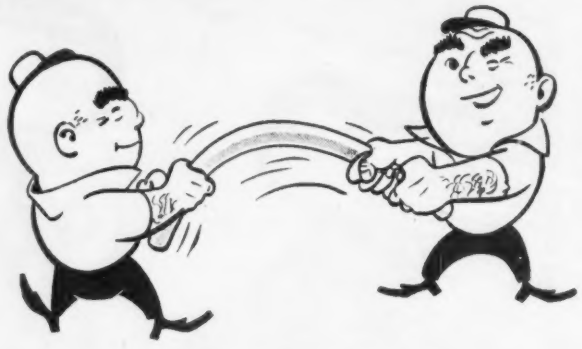
PRODUCERS OF STEEL SHEETS, including SUPERIOR Galvanized, COPPERIOR (copper-steel base) Galvanized, SUPERIOR Galvannealed, CHECKERCOAT Galvanized, Hot Rolled Annealed, Hot Rolled Pickled, Long Terne, and many styles of Galvanized Formed Roofing.

ALSO, Manufacturer's Wire in many sizes, shapes, tempers and finishes, Continental Chain Link Fence, Nails, and other steel products.

HOW BUNDYWELD SCORES
ON ACTUAL STRENGTH TESTS

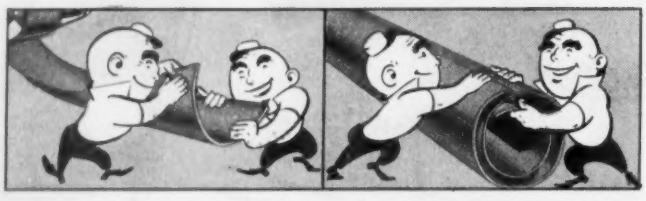


(1) **ULTIMATE** bursting strength (¼" x .028" annealed) of 12,500 lbs. per square inch.



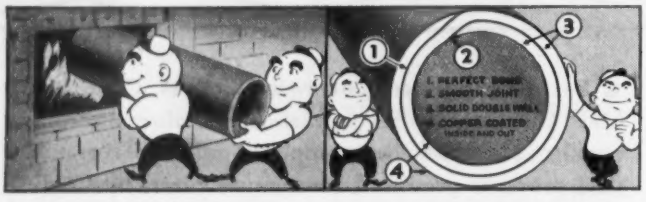
(2) **UNUSUALLY** high fatigue strength . . . especially recommended for use where vibration occurs.

HOW BUNDYWELD IS MADE



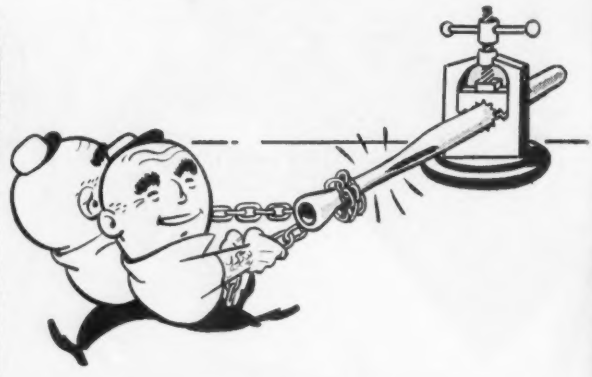
1 Bundyweld Tubing is made by a process entirely different from that used in making other tubing. A single strip of copper-coated S.A.E. 1010 steel is continuously rolled twice laterally...

2 . . into tubular form. Walls of uniform thickness and concentricity are assured by the use of close tolerance cold rolled strip. This double rolled strip passes through a furnace where the . . .

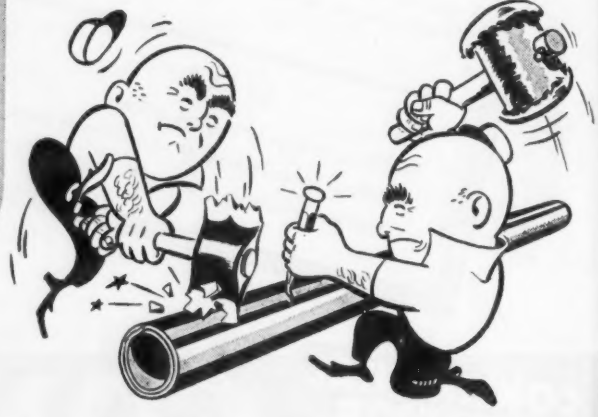


3 . . copper coating fuses and alloys with the double steel walls. After brazing and cooling, it becomes a *solid* double wall steel tube, copper brazed throughout 360° of wall contact . . .

4 . . copper coated inside and out, free from scale and closely held to dimensions. Hard or annealed in standard sizes up to ⅝" O.D. Special sizes cold drawn. Also furnished in Monel.



(3) **ULTIMATE** tensile strength (annealed) 45,000 to 52,000 P.S.I. — yield strength, 30,000 to 36,000 P.S.I. — per cent elongation in 2" — 30% to 40%.



(4) **HARDNESS** — Rockwell (30T — scale) 43 - 50.

For further information, write Bundy Tubing Co., Detroit 13, Michigan

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ENGINEERED TO YOUR EXPECTATIONS

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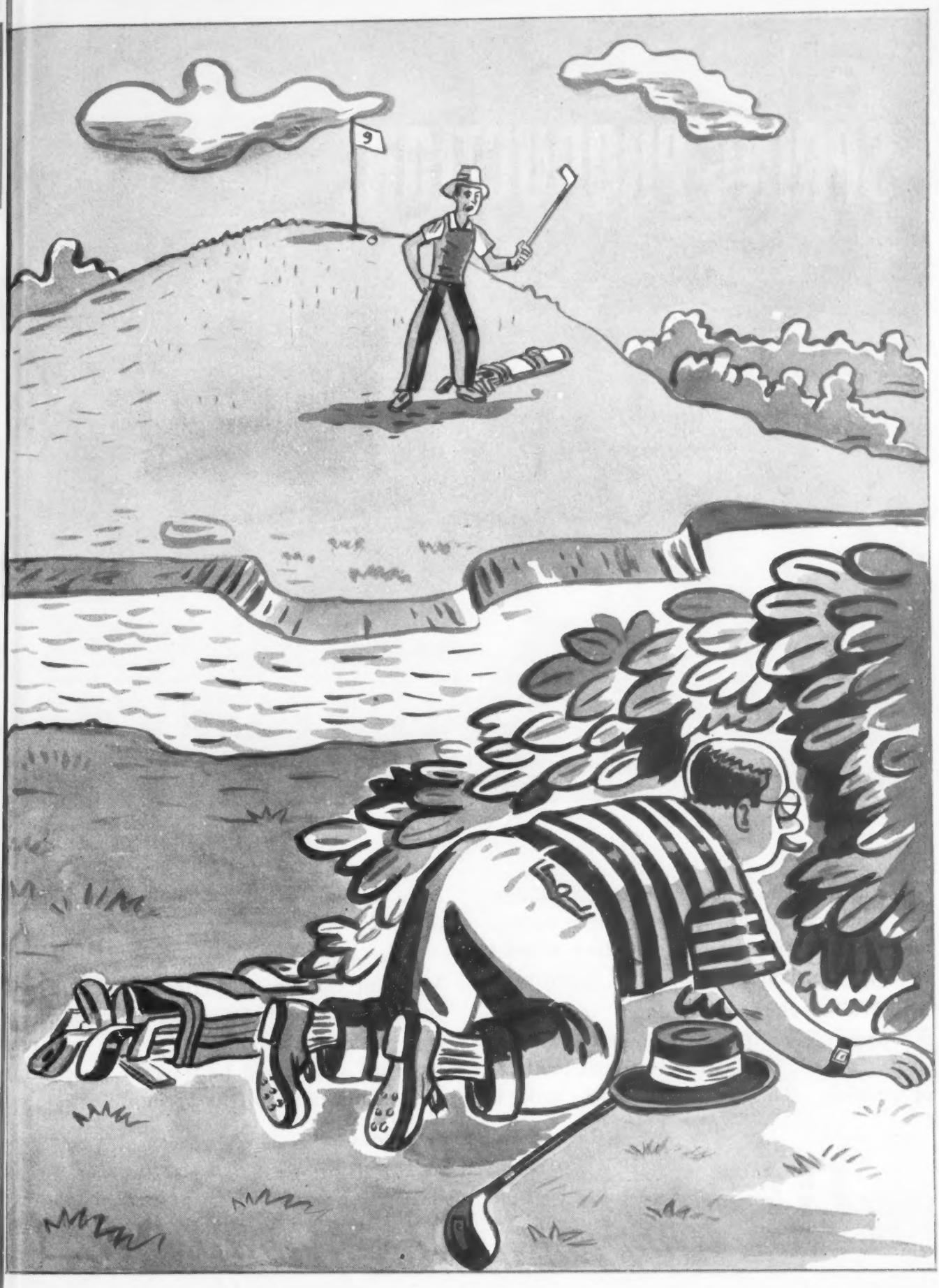

"I CAN'T FIND THE BALL, BUT HERE'S SOMETHING BETTER—A BRAND NEW BOX OF **CHAMPION WELDING ELECTRODES!**"

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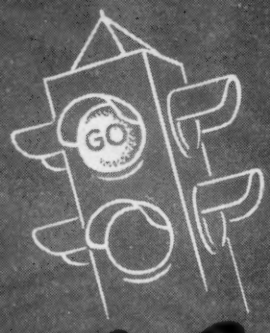
SPRING PRODUCTION



Efficiency

To Give You Both QUALITY & SERVICE

THE man who said "My business is different" could easily have been a spring-maker. Certainly no other product is beset with more variables—size, shape, quantity.

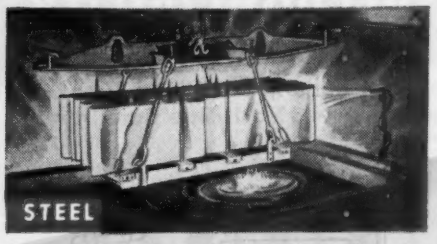
In Wallace Barnes procedure, "your spring *is* different," and its production receives careful engineering analysis for efficient methods of handling. This is so whether the order is large or small; whether tolerances are tight or flexible.

How to make springs may not concern you. Your interest lies in performance, cost and speed of delivery. Our practice of *engineering* production methods works to your best interests and should be a factor in selecting your source of supply for springs.

"Barnes-made is well-made"

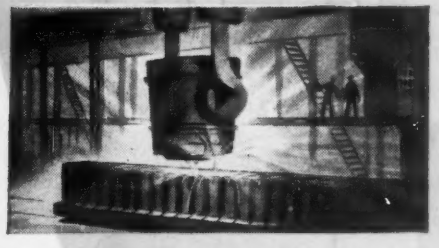
WALLACE BARNES COMPANY DIVISION OF ASSOCIATED SPRING CORPORATION
BRISTOL, CONNECTICUT, U. S. A.

FOR DEPENDABILITY IN METAL CHEMICALS



PICKLING—Sulfuric Acid—Hydrofluoric Acid—Muriatic Acid—Nitric Acid—Phosphoric Acid—Chromic Acid.

Detergents: Sodium Metasilicate—Trisodium Phosphate—Sodium Silicate—Tetrasodium Pyrophosphate.

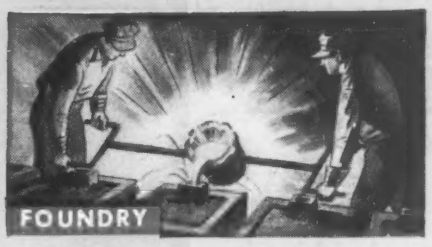


RIMMING STEEL—Sodium Fluoride for smoother-surface rimming steel.

COKE BY-PRODUCTS—Sulfuric Acid for making ammonium sulphate; for washing toluene and benzene, and for treating light oils.

Sodium Cyanide—Sodium Fluoride—Sodium Cyanate—Potassium Cyanate, for heat treating and controlling temperature.

...SPECIFY "GENERAL CHEMICAL"



Casting Cleaning Acid (Hydrofluoric Acid)—Sodium Silicate—Zinc Chloride—Chromic Acid • Ammonium Fluoborate—Sodium Fluoborate—Potassium Fluoborate, Anti-oxidants and inhibitors • Potassium Fluoride—Lithium Fluoride and Other Welding Fluxes • Fluoboric Acid: Solvent for silica, in cleaning surfaces.

Lead Fluoborate—Tin Fluoborate—Zinc Fluoborate—Cadmium Fluoborate—Copper Fluoborate, etc.

FOR METAL ANALYSES: BAKER & ADAMSON REAGENTS AND FINE CHEMICALS

BASIC CHEMICALS

GENERAL CHEMICAL COMPANY

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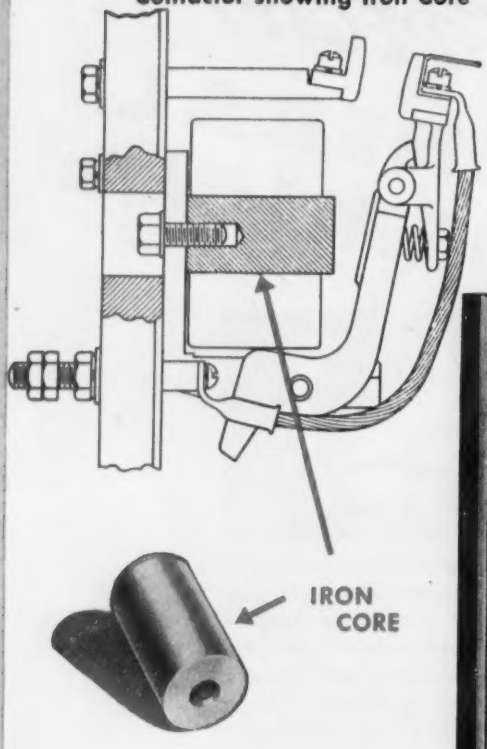
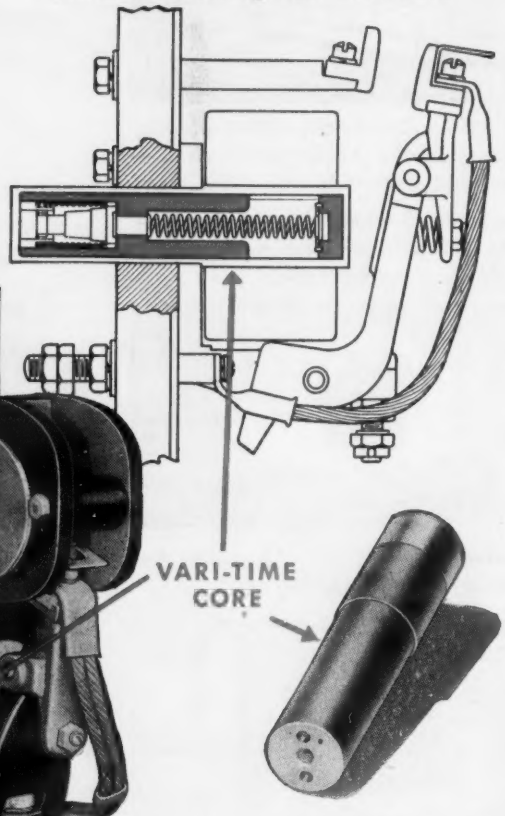
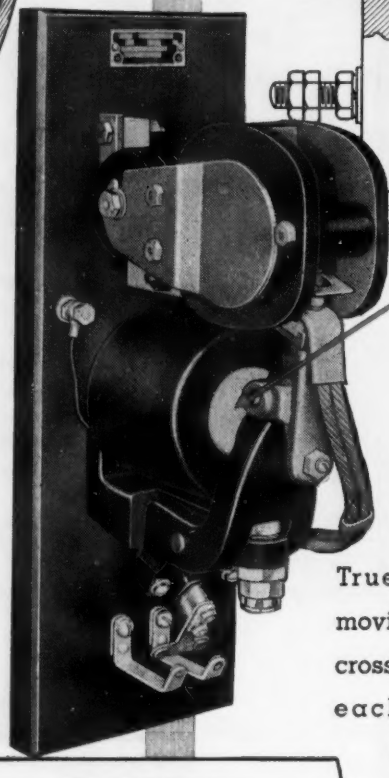
To your MAINTENANCE MAN *the* VARI-TIME CORE *is a* SOLID CORE... *it has* UNIT RESPONSIBILITY

Cross-Section of Bulletin 7400 Type RD Contactor showing Iron Core



Cross Section of Bulletin 7400 Vari-Time Contactor showing Vari-Time Core





You would not expect to have maintenance problems with the solid core shown above.

You might, however, expect to have maintenance problems with the mechanism of the "3C" Vari-Time Core.

But, built as the Vari-Time core is, you will have no more difficulty with it than you do with the iron core.

15 YEARS

of maintenance-free operation have established the stability of the Vari-Time Core, and have justified our guarantee:—"The Clark Controller Company will replace free of charge, any core which will fail in service during the lifetime of the controller."

True, the Vari-Time Core has moving parts as shown in above cross-section. At the same time each core is hermetically sealed in oil to establish its *unit responsibility*.

It is designed and built in sizes to suit required magnetic properties. Mechanically, it proves to be a giant for the work it has to do.

The Vari-Time Core provides completely reliable definite time delay for Bulletin 7400 DC Vari-Time Accelerating Contactors

ASK FOR FULLY DESCRIPTIVE BULLETIN 7400

THE CLARK CONTROLLER CO.

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WHEN RECONVERSION TO CIVILIAN PRODUCTS

makes LOW-COST an important production factor... use dependable

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Surface preparation of metal parts before final finishes are applied is a PRODUCTION OPERATION importantly influencing product COST. Dependable, fast, economical Oakite cleaning helps you keep this operation at or below specified limits.

36 Years' Experience

Long experience serving thousands of plants manufacturing practically every civilian type product, implemented by successful experience in finding the right answers to complex production-cleaning problems on a wide range of war supplies, provides the sound basis and reasons that prompt so many leading concerns to select and rely on the Oakite organization for authoritative technical help and the materials and methods that keep production volume up and costs down.

You are invited to apply this valuable experience to your work, particularly when changing over from war to civilian supplies.

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Oakite's field staff of technically trained men with their intimate knowledge of metal surface preparation requirements and the operations associated with them are always at your service, as also our chemical and mechanical research laboratories, without cost or obligation. This personal help and advisory service is yours for the asking on any reconversion production-cleaning problem.

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TELL US YOUR PROBLEM: **The operations of cleaning and surface preparation figure so largely in production cost that Oakite offers all its comprehensive facilities and "know-how" to keep them on an economical basis. Whatever your product or cleaning problem, write us today. All inquiries promptly answered.**

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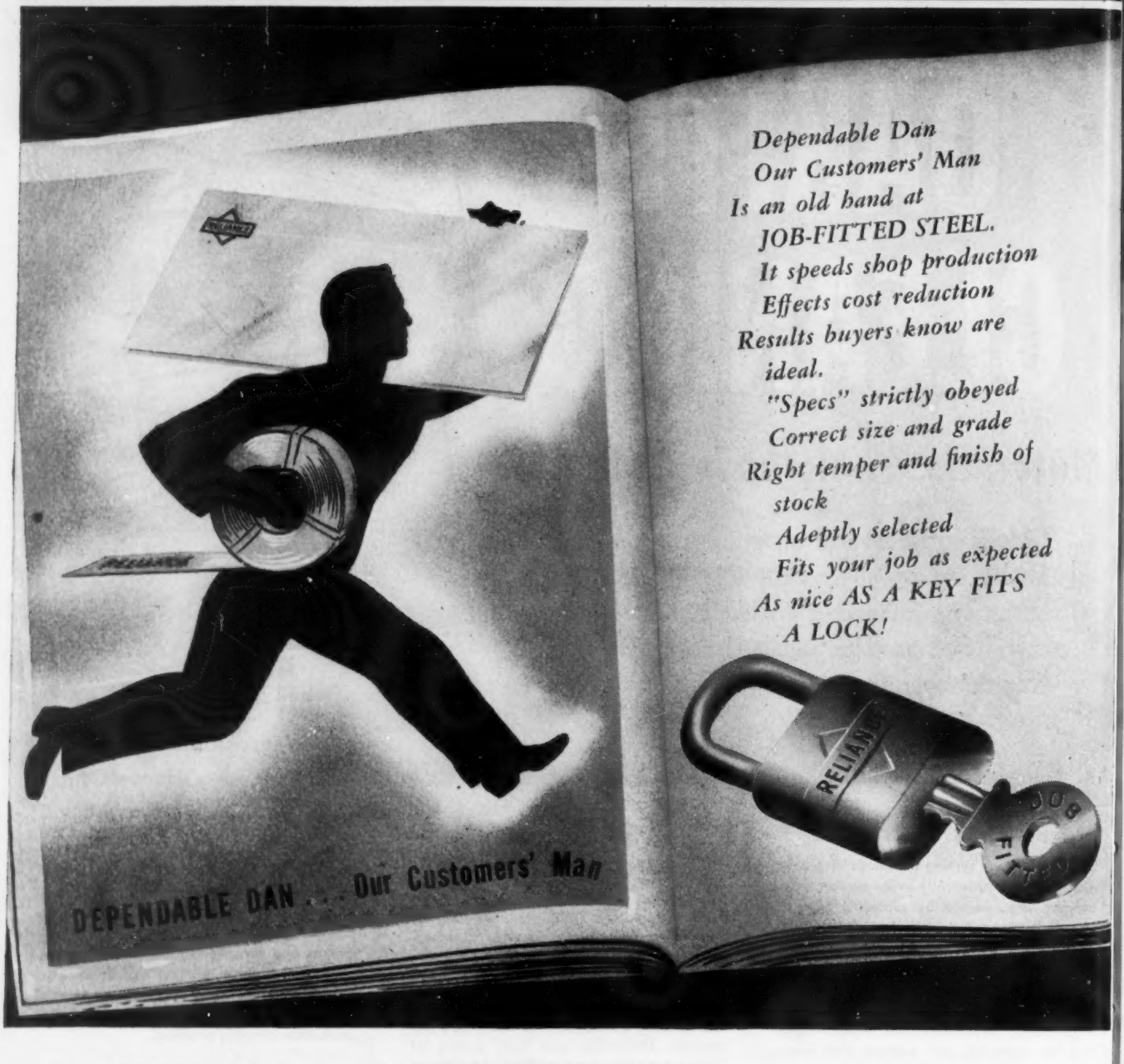

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"Specs" strictly obeyed
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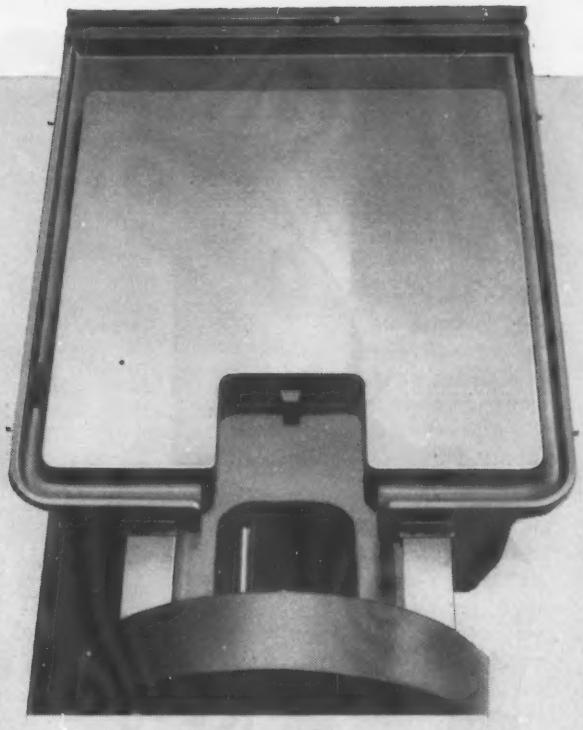
HERE'S WHY WE CALL IT *The* SIMPLIMATIC

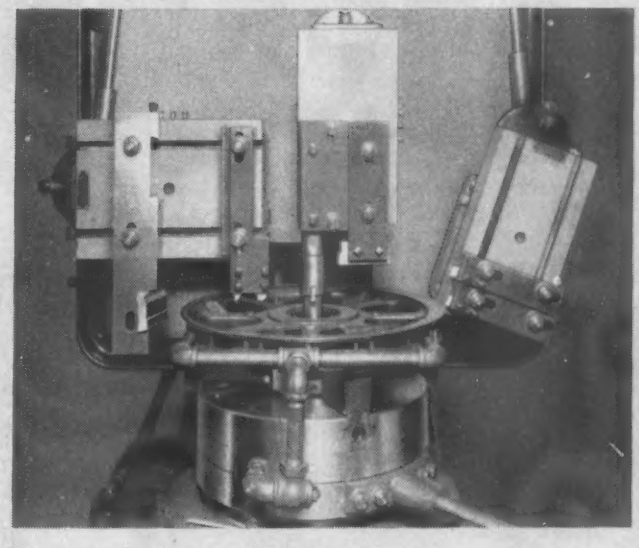


Its simplicity starts with this first basic idea: The use of this large horizontal table which makes it possible to place every tool in its most favorable working position. Here, a greater number of slides can be used. A greater variety of positions is possible. Angle feeds are no problem. Compound slides are unnecessary.

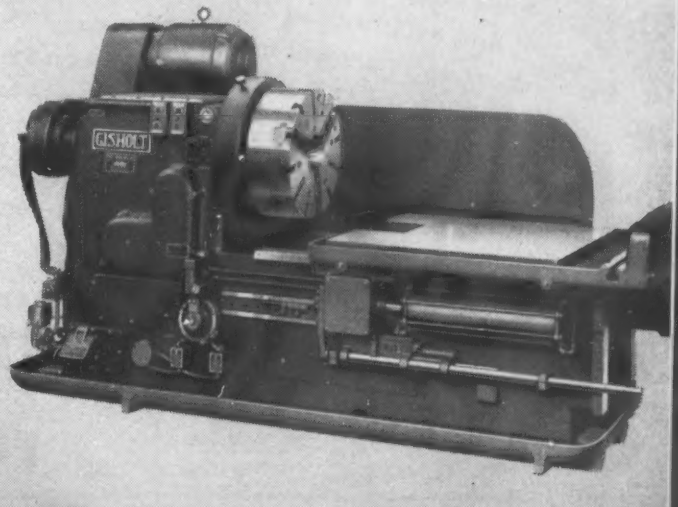
Tool set-up is simpler and more effective. With each slide individually cammed, all slides are independent of each other as to approach, order of engagement with work, rate of feed, dwell, and retract.

Only one simple lever is required to control the complete cycle of machining operations. It doesn't take skill to keep this automatic lathe turning out work swiftly and within the limits.

"SIMPLIMATIC" really describes this simple automatic lathe. If you have parts in volumes to justify its use, get all the facts about it. Write for literature.



With this typical Simplimatic tool set-up, turning and shaving the tapered outside diameter, boring, facing, grooving and chamfering are done simultaneously, in one operation. Tools are quickly and easily adjusted for a variety of sizes.



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Keep Ahead . . .
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PRODUCTION UP
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Flexarc ACP Electrodes speed production of sound welds in all positions . . . .

It makes a lot of difference which electrode your operators use. If they don't have a supply of the new Westinghouse ACP Electrodes, you are missing one of the most important welding developments in the past ten years.

You can speed up work with the new ACP and improve the quality of welds. The ACP rod forms a light, porous slag which can be easily removed by light brushing without waiting for the weld to cool.

And welds with an ACP electrode are strong, dense and ductile. Your operators will immediately sense a new drive and penetration with the ACP electrode. It produces excellent results in making lap joints and horizontal fillet welds. Equally important to you is the fact that the ACP is an all-position a-c or d-c electrode.

For complete information about this new electrode, write today for a copy of B-3353, Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-21338

WHY ACP ELECTRODES ARE PREFERRED FOR ALL-ROUND WORK WITH A-C OR D-C

- Easy slag removal. Light porous slag permits quick removal with stroke of welding rod or light brushing . . . minimum amount of time and effort.
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ONE OF THE WESTINGHOUSE "BIG 5"

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Achieving this consistent precision requires a constant vigilance over production operations and many leading gear manufacturers have designated Vinco Dual Purpose Gear Rolling Inspection Fixtures—coordinated with Vinco Master Gears, as an essential to successful inspection control. The dual purpose fixture, as the name implies, has the important advantage of checking both the run-out and backlash of the part gear with one Vinco master gear; a Vinco feature that saves time, cuts operating costs and increases production. For a more detailed description write for BULLETIN NO. 91.

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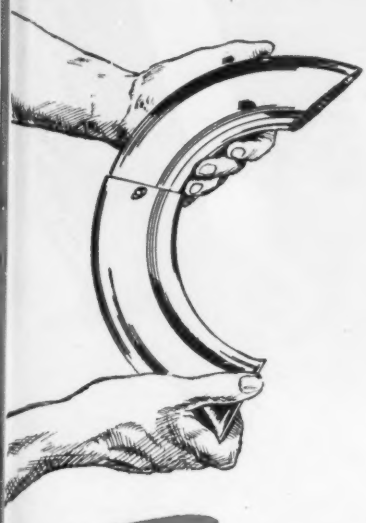
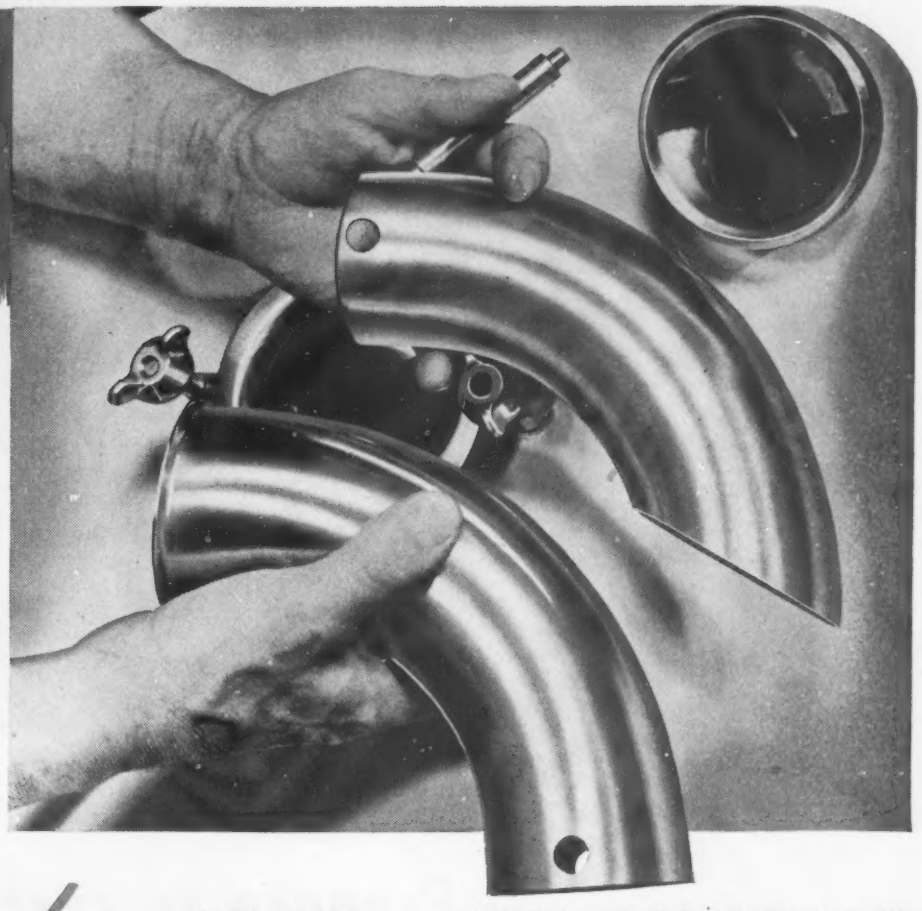
HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI DUTY ELECTRIC EXCLUSIVELY

MILWAUKEE, WISCONSIN

This stainless steel inlet for a milk storage tank is made in two pieces so that, when disassembled for washing, the entire surface is open to visual inspection.





Safe for MILK *or* MAYONNAISE

..strong..tough..resistant to wear

• Wherever tubing comes in contact with "delicate" products—even easily contaminated foods such as milk or mayonnaise — Republic ELECTRUNITE Stainless Steel Tubing is more than *SAFE* to use.

It's safe — because it is clean, sanitary, and easy to keep clean. It resists corrosion. It does not contaminate metallically. These statements have been proved by a 25-year record established by ENDURO—the metal from which this tubing is made.

And it's strong, tough, resistant to wear. There's no danger of breakage—no wearing through of the surface—because it's solid stainless steel throughout.

But there's even more to the story when you use tubing made by the ELECTRUNITE Process. There's a consistent uniformity of wall thickness, diameter, roundness and workability.

ELECTRUNITE Stainless Steel Tubing is made in a wide range of sizes, gauges, finishes and analyses. For further information, write to:

REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION • CLEVELAND 8, OHIO
Export Department: Chrysler Bldg., New York 17, N. Y.

Republic
ELECTRUNITE
Reg. U. S. Pat. Off.
STAINLESS STEEL TUBING

Also Carbon Steel Mechanical Tubing—Aircraft Tubing—Boiler, Condenser and Heat Exchanger Tubes

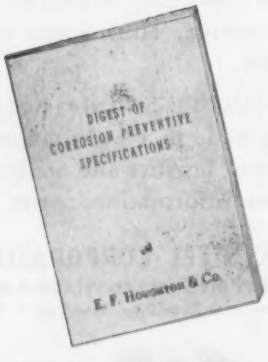
RIGHT NOW!

...Prepare to rust-protect your war machinery before storage

Either government-owned equipment or your own war machines will have to be carefully protected against corrosion before they can be moved out to make room for peace-time manufacturing.

Even though that great day may not have actually arrived, it's time to prepare for it, *right now,* so you will not have a last-minute shortage of the necessary materials. It will take time to collect the lumber, paper, containers and rust preventives needed to fulfill Uncle Sam's published packaging instructions.

That's a big job—one that will be made easier by a talk with the Houghton Man, who knows how others are handling it, preferred methods of application, and information on the various preventives we supply to meet these specifications. Our 70-year experience in fighting rust is at your service. E. F. HOUGHTON & CO., 303 W. Lehigh Ave., Philadelphia, and all principal cities.



FREE—This pocket-size digest of the principal corrosion preventive "specs" for which Houghton supplies approved products.

Houghton's RUST Preventives

For Speed, Accuracy and Economy

BETTS 100″ BORING AND TURNING MILL

As in all Betts machines, the accumulated experience of more than three-quarters of a century is built into this general purpose boring mill . . . another striking example of Consolidated's ability to combine accuracy and power with maximum productiveness.

BETTS BORING AND TURNING MILLS are built from 100″ up to any requirement

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BORING MILLS
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PLANERS
SLOTTERS
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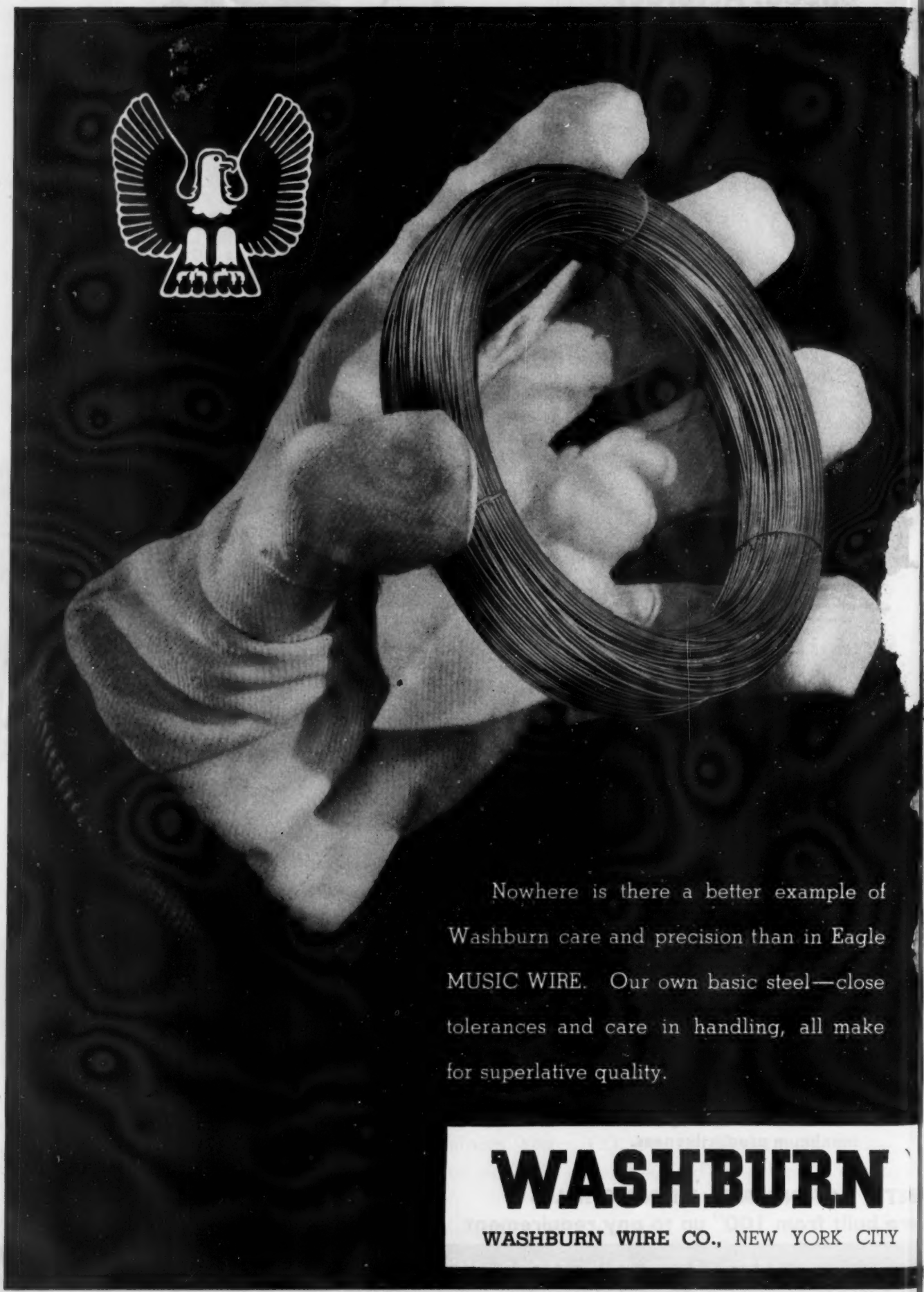
CONSOLIDATED MACHINE TOOLS

CONSOLIDATED
MACHINE TOOL CORPORATION
ROCHESTER 10, NEW YORK

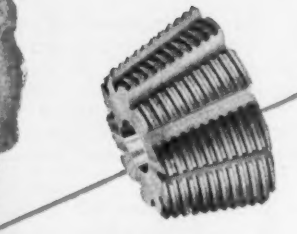

Nowhere is there a better example of Washburn care and precision than in Eagle MUSIC WIRE. Our own basic steel—close tolerances and care in handling, all make for superlative quality.
WASHBURN
WASHBURN WIRE CO., NEW YORK CITY

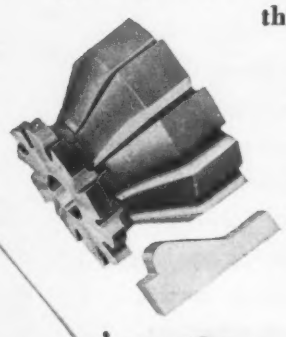
CLEAN, UNIFORM BILLETS—STRIP—RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

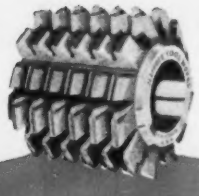
EADQUARTERS FOR ENGINEERED CUTTING TOOLS

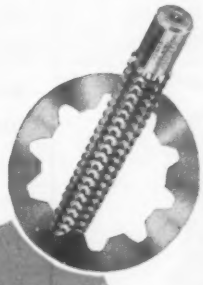
A Heart IN THE
PRODUCTION OF ILLINITE CUTTING TOOLS

To prevent decarburization or oxidation, a chemically balanced atmosphere is maintained in the high speed steel furnaces where ILLINITE Cutting Tools are hardened. This is an excellent example of the great care that is taken at every step to give you tools of the highest quality. But, Illinois Tool offers even more . . . an experience of thirty-two years in helping the leading industrial firms of America solve their metal cutting problems. Consult an Illinois Tool engineer—let him help you gain the benefits of ILLINITE Cutting Tools—specially engineered for your particular application!









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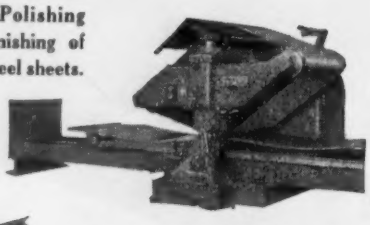
TOOL WORKS

2501 North Keeler Avenue • Chicago 39, Illinois
In Canada: Canada Illinois Tools, Ltd., Toronto, Ontario

MANUFACTURERS OF METAL CUTTING TOOLS AND SHAKEPROOF PRODUCTS

MATTISON
ABRASIVE BELT GRINDING AND POLISHING MACHINES

Mattison W-455 Wide Belt Grinding and Polishing Machine for finishing of wide stainless steel sheets.



Mattison S-441 Grinding and Polishing Machine for flat and curved work. Can be furnished with or without special fixtures, depending on work ground.

Mattison J-400 Backstand Idler adapts regular polishing Jack to the use of factory-coated abrasive belts.

Mattison H-424 Internal Tube Grinding and Polishing Machine for finishing inside of metal tubes.

Mattison L-138 Grinding and Polishing Machine arranged for wet grinding.

★ Results obtained in a number of plants definitely establish the use of factory coated abrasive belts as a most efficient practice. Besides reducing the number of rejections and improving the finish, they have cut the polishing cost per piece through increased production.

However, to secure full benefit from factory-coated abrasive belts, the right type of mechanical unit is necessary. The machine is all important for properly applying the abrasive to the particular job to be done.

Mattison Abrasive Belt Grinding and Polishing Machines are engineered with a knowledge of the factors involved to give the best application of belts. From the time factory-coated abrasive belts were introduced for metal grinding and polishing, Mattison's have developed and built machines to provide best results.

Mattison Abrasive Belt Grinding and Polishing Machines are used for smoothing up welding marks, polishing solid parts—such as handwheels, levers, handles, steel sheets including stainless steel—and the inside of tubes. They are built for both the wet and dry grinding method. In addition to the finishing of metal parts, they are used for plastics, hardened rubber, fibre, glass, etc. In fact, the applications are so numerous, only a few can be mentioned and shown on this page.

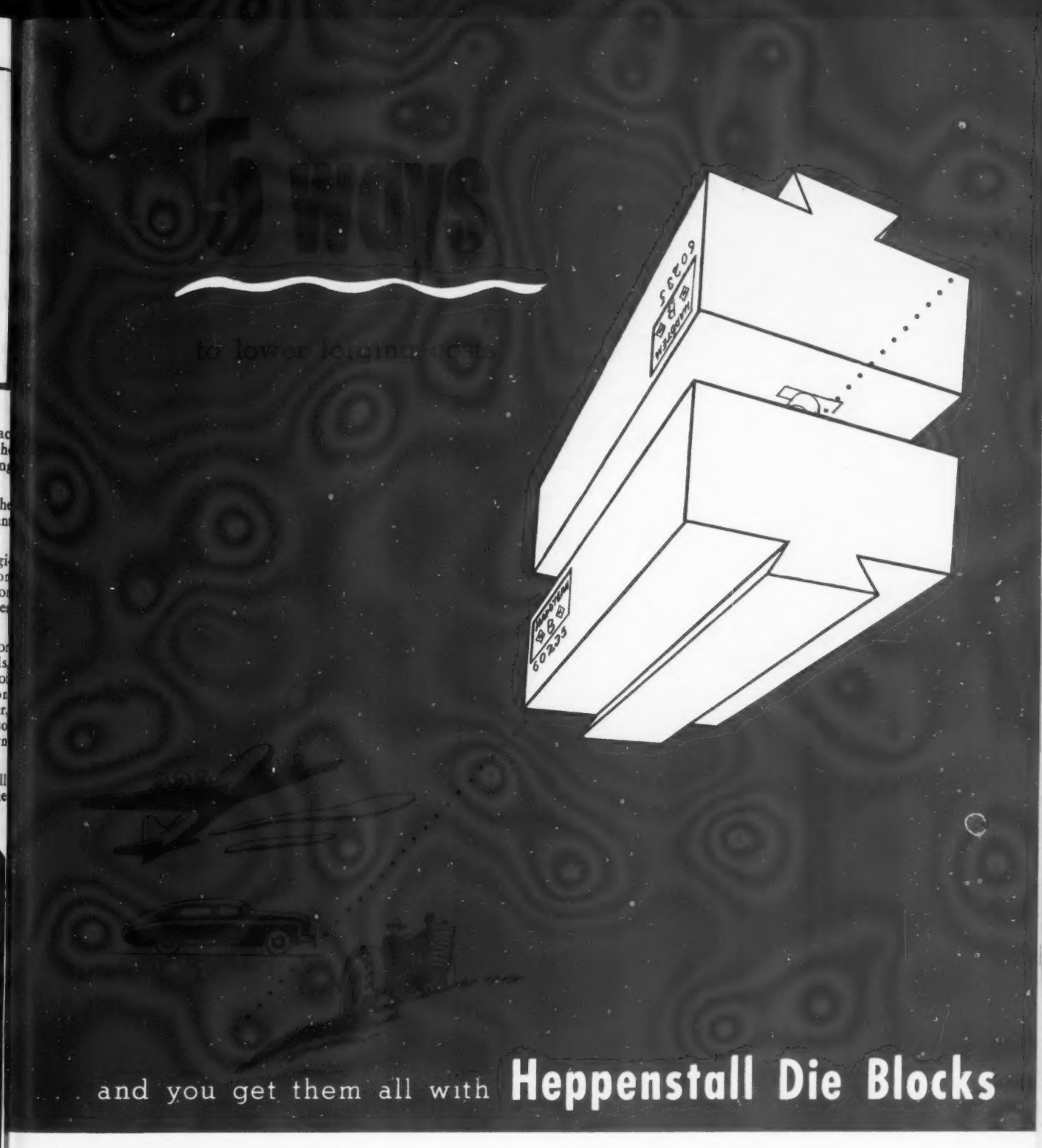
MATTISON GRINDING MACHINERY

Whatever your problems may be, it is well worth while to make an investigation as to the machine available for handling it.

SEND FOR *FREE* BOOKLET

Illustrates various applications of Mattison Grinding and Polishing Machines, built to secure best results from factory-coated abrasive belts. Also gives helpful data on grinding and polishing metals, plastics and other materials with abrasive belts. Write today for your copy.

MATTISON MACHINE WORKS
ROCKFORD · ILLINOIS



. . . and you get them all with **Heppenstall Die Blocks**

Heppenstall Die Blocks start you off with a substantial, competitive advantage. Heppenstall's *patented* analysis steel, heat treated by Heppenstall's *exclusive* Hardtem process—assures (1) easier machinability, (2) adaptation for use without heat treatment by the user, (3) an impression that can be resunk repeatedly without annealing, (4) a block that can be replaced in service without hardening, and of course, (5) *more forging per sinking* . . . This may be your answer to stiffer competition. Contact your nearest Heppenstall salesman.

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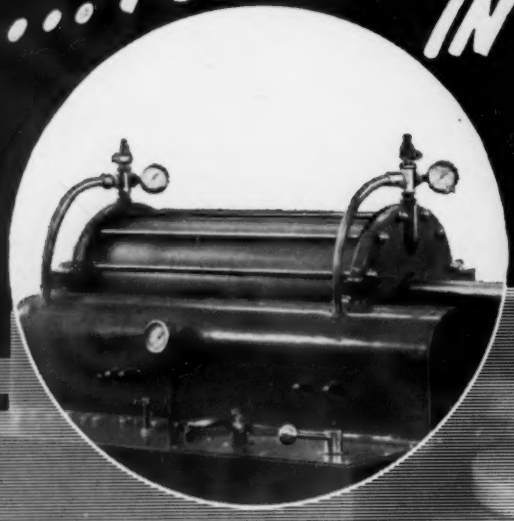
Heppenstall Co.
Pittsburgh 1, Pa.

INDUSTRY SPECIFIES

T-J CYLINDERS

... FOR TOUGH JOBS IN POWER MOVEMENT



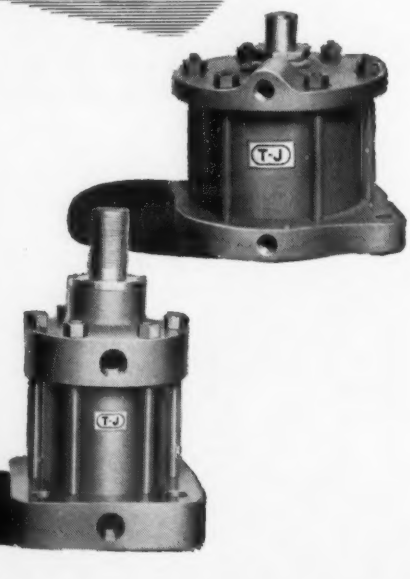
A T-J Cylinder has a vital job on this Pressure Contour Forming Machine! Used with various fixtures for producing contours in aircraft wings, fusilage, top body parts and similar structures.

FOR PUSH-PULL-LIFT JOBS...100 LB. OR 50,000 LB.

Today—more and more tough jobs in power movement throughout industry are geared to T-J Air and Hydraulic Cylinders!

Whether it's pushing, pulling, lifting, clamping or controlling... T-J Cylinders simplify the job and speed up production! Ideal for machines and equipment such as presses, hoists, shears, valves, brakes, hopper gates, ovens —or any place where efficient *controlled power movement* is needed. Many standard sizes and styles...both cushioned and non-cushioned types. Precision-manufactured to deliver smooth dependable power in every stroke —with utmost dependability and long life! Write for latest catalogs.

The Tomkins-Johnson Company, 618 Mechanic Street, Jackson, Michigan.



FOR TOUGH JOBS SPECIFY T-J

TOMKINS-JOHNSON

RIVITORS...AIR AND HYDRAULIC CYLINDERS...CUTTERS...CLINCHORS

"WITH GULF CUT-AID WE INCREASED PRODUCTION AND ELIMINATED DRAG MARKS"

says this grinding dept. Foreman

Grinding department Foreman of aircraft engine plant (center) consulting with Gulf Service Engineer on results obtained with Gulf Cut-Aid in grinding aluminum alloy piston skirts.

"WHEN WE USED SOLUBLE OIL the wheel loaded after grinding a few piston skirts, which resulted in drag marks and a poor finish," says this grinding department Foreman. "Since switching to Gulf Cut-Aid we have ground over 2,000 skirts without a drag mark—and consistently get a No. 10 mirror finish."

Well known for its superior performance in cutting aluminum, aluminum alloys, and other nonferrous metals, Gulf Cut-Aid is being used in more and more plants as a grinding fluid.

Call in a Gulf Service Engineer today and let him show you how Gulf Cut-Aid and other Gulf quality oils can help you with your production problems. For your copy of the booklet on Gulf Cutting Oils, send the coupon below.

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Please send me, without obligation, a copy of the new revised booklet, "Gulf Cutting Oils," which includes a helpful Machining Guide.

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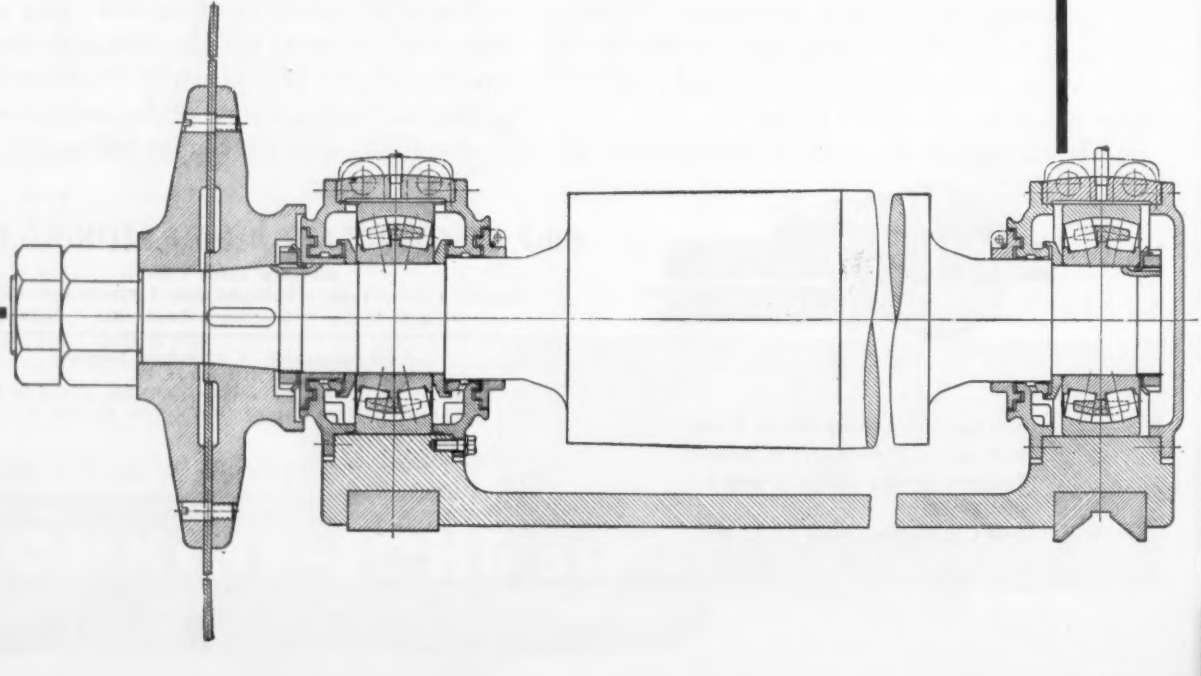
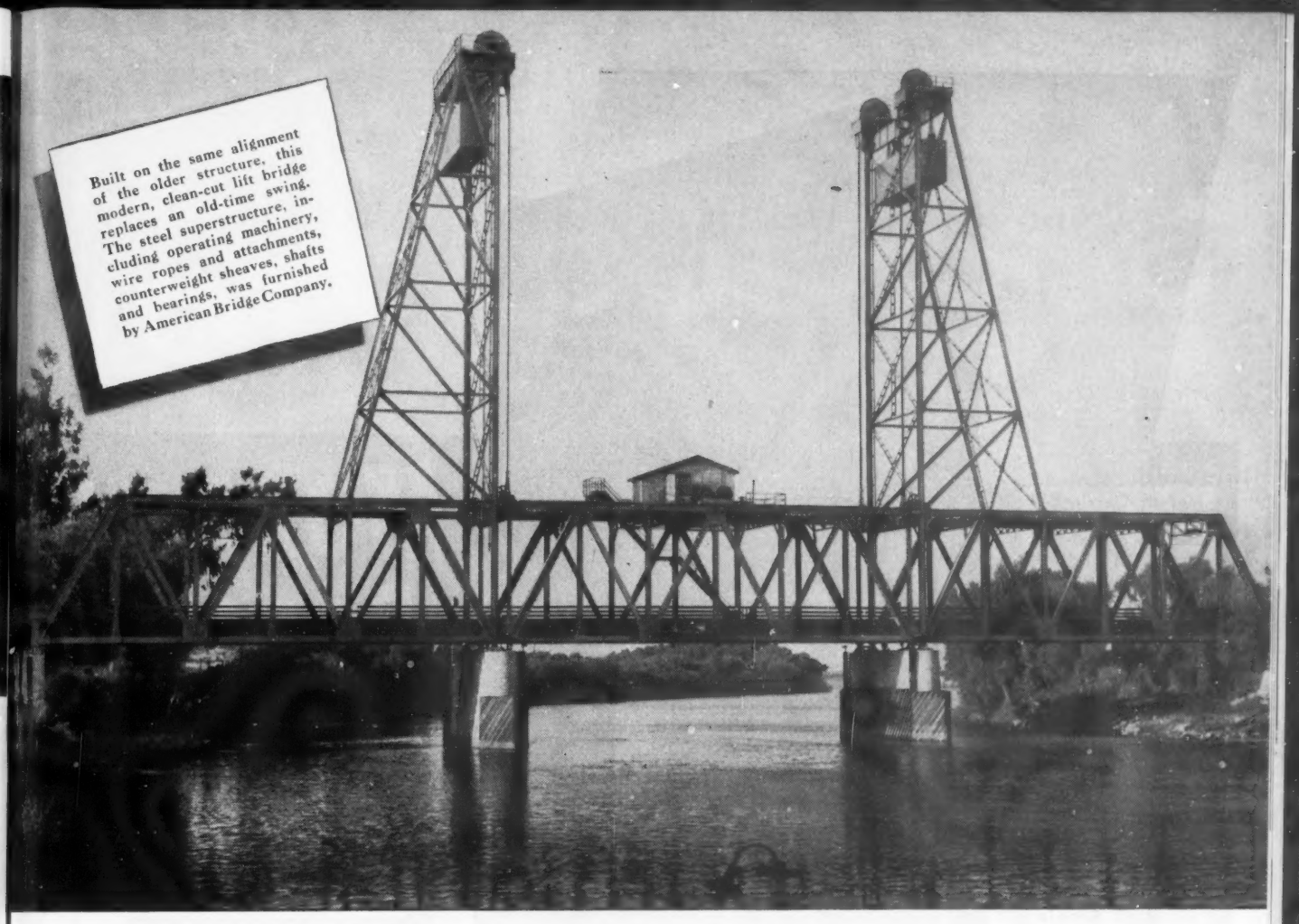
EASING HEAVY DUTY SAW OPERATION

The rolling alignment of SKF Spherical Roller Bearings plays an outstanding part in the smooth operation of high speed, heavy duty saws. It compensates for momentary deflections and prevents internal binding which would develop high frictional heat and complicate lubrication. It assures equalized load distribution . . . full bearing capacity available at all times. For information regarding all types of SKF applications in the Steel Industry, send for "Steel Mill Data for Calculation and Design." 5842

SKF INDUSTRIES, INC., FRONT ST. & ERIE AVE., PHILADELPHIA 34, PA.

SKF
ROLLER BEARINGS




Built on the same alignment of the older structure, this modern, clean-cut lift bridge replaces an old-time swing. The steel superstructure, including operating machinery, wire ropes and attachments, counterweight sheaves, shafts and bearings, was furnished by American Bridge Company.

BRIDGES FOR TOMORROW

ELIMINATION of transportation bottlenecks on strategic railroads is exemplified by this modern, double-track lift bridge which replaces an old-time swing.

The "old-timer," built 50 years ago, rendered yeoman service in the years of lighter roadbed loadings and slower train speeds. Within its limited capabilities it performed faithfully, even within the early period of the war emergency. But its light construction, its slow-operating swing span, and its single-track in an otherwise double-tracked system, handicapped train movements with slow speed restrictions.

The new, double-track structure, with a fast operating lift span, eliminates slow-speed orders and reduces navigation interruptions to a minimum. Engineered to the requirements of today's heavy power, traffic density and high speed operations, it embodies design and construction elements that contribute to great permanence, low maintenance costs and sound operating economies.

Modern bridge structures such as this point the way to the coming job of roadbed rehabilitation because postwar competition will demand a continuance of the outstanding service rendered by America's railroads during the war.

When peace comes, American Bridge, too, will be able to put aside its war job. Then, with vastly greater facilities, resources and experience, we will be fully prepared to meet every structural need of the nation's railroads.

AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

District Offices in: Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit
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Columbia Steel Company, San Francisco, *Pacific Coast Distributors* United States Steel Export Company, New York

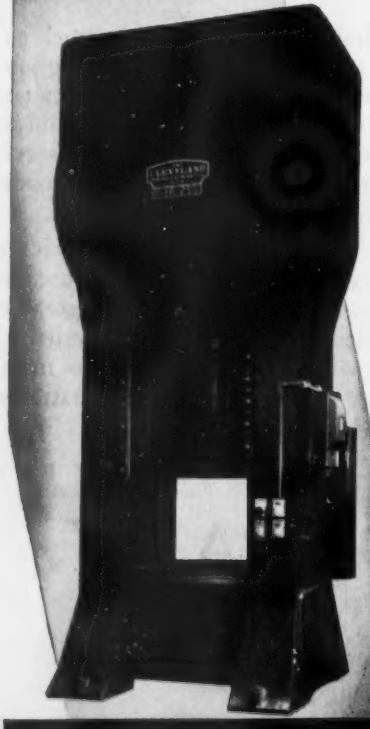
AMERICAN BRIDGE COMPANY · USS STEEL · UNITED STATES STEEL

UNITED STATES STEEL

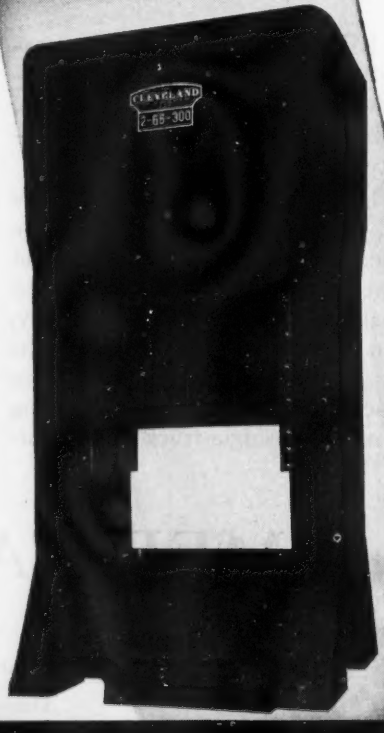
MODERN PRESSES

Modern Cleveland 4 Point Press having a capacity of 750 tons, stroke 30", adjustment 6", Bed area 80" x 144", shut height 60" and operates at 14 strokes per minute.

Cleveland Single Point Press, capacity 250 tons, stroke 12", adjustment 5", bed area 36" x 36", strokes per minute 18".



Cleveland Two Point Press, capacity 300 tons, stroke 16", adjustment 8", bed area 40"x 66", strokes per minute 12.



The Modern line of Cleveland Presses consists of Single Point Presses having a single connection located in the center of the slide; Two Point Presses having two connections, one at each side of the slide; and Four Point Presses having four connections, one of each being located at approximately each corner of the slide. The design of these Cleveland Presses is such that the gears, flywheel and drive unit are enclosed in the box type Crown and there are no overhanging projections. This type of press can be furnished in sizes to suit requirements and with electrically controlled hydraulically or pneumatically operated clutch.

THE CLEVELAND PUNCH & SHEAR WORKS CO. CLEVELAND 14, OHIO

Sure cure for the "shakes"

UNDER the terrific vibration of aircraft engines, screws and nuts have a tendency to become loose. That's why Army and Navy specifications call for safety wiring on engine mountings, instruments, gun sights, magnetos . . . *every* place on a plane where a screw or nut might shake loose.

By simply drawing the wire through a small hole in each nut or screw, and then twisting tightly with pliers, a positive sure cure for the "shakes" is provided.

Wire for this important function must be highly resistant to corrosion, tough enough to resist fracturing under the heat and vibration of aircraft engines, and soft enough to twist with pliers for quick assembly and replacement of parts. Here at National-Standard we've developed a type of slow-annealed stainless steel wire to fully meet these exacting requirements. And we're drawing millions of feet of this wire, not only for aircraft but also for many other automotive applications.

Developing special wire for special purposes has been an important part of National-Standard's business for more than 38 years. Perhaps our unique engineering and manufacturing facilities can help you with your wire and wire fabricating problems.

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NATIONAL-STANDARD Company
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WAGNER LITHO MACHINERY CO.
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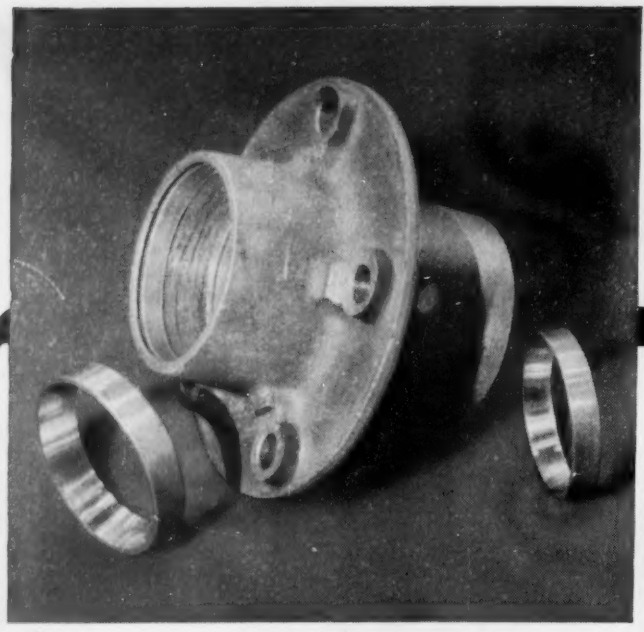
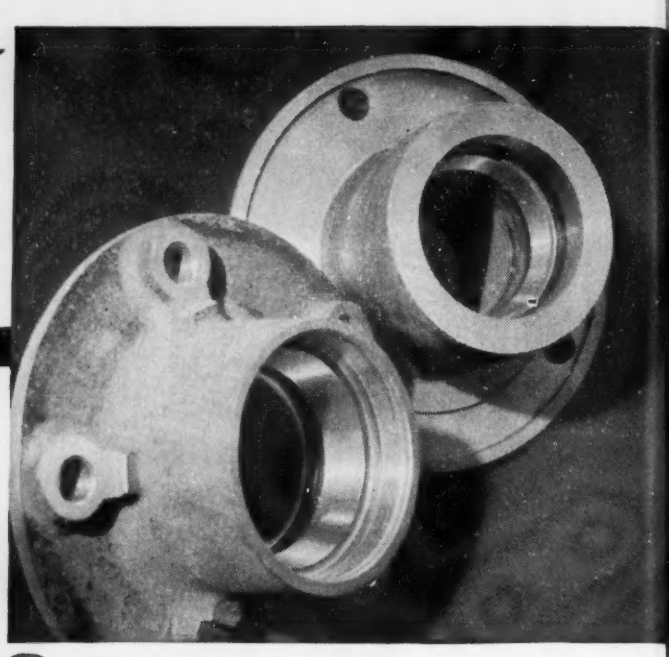
LITHOGRAPHING AND SPECIAL MACHINERY





1 THE PROBLEM

To improve bearing concentricity in automotive wheel hubs and, at the same time, cut the cost of production and eliminate separate bearing cups.

2 THE ANSWER

The bearings are made as an integral part of the hub and hardened by induction heat treatment. A Cross Special Machine then grinds and hones the bearings to 3-micro inch surface finish.

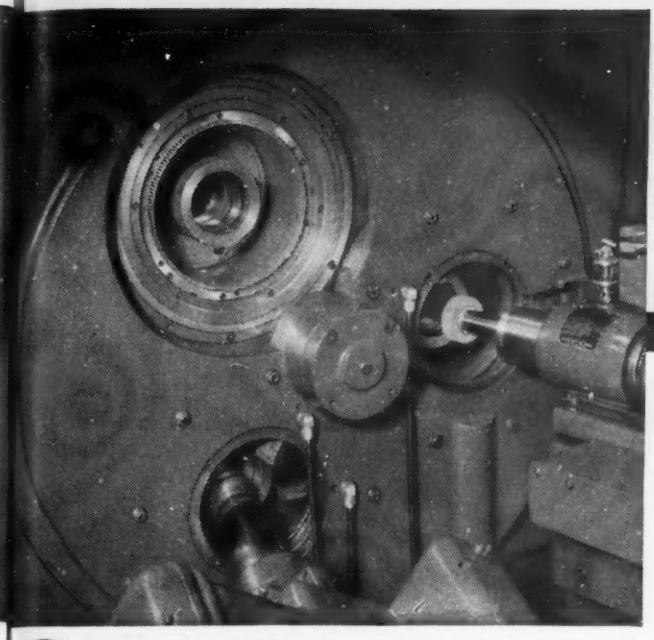
3 THE SAVINGS

The machine replaces 4 skilled operators and 3 machines while returning 33% savings on the original investment.

Cut Your Costs with A Special Cross

CROSS

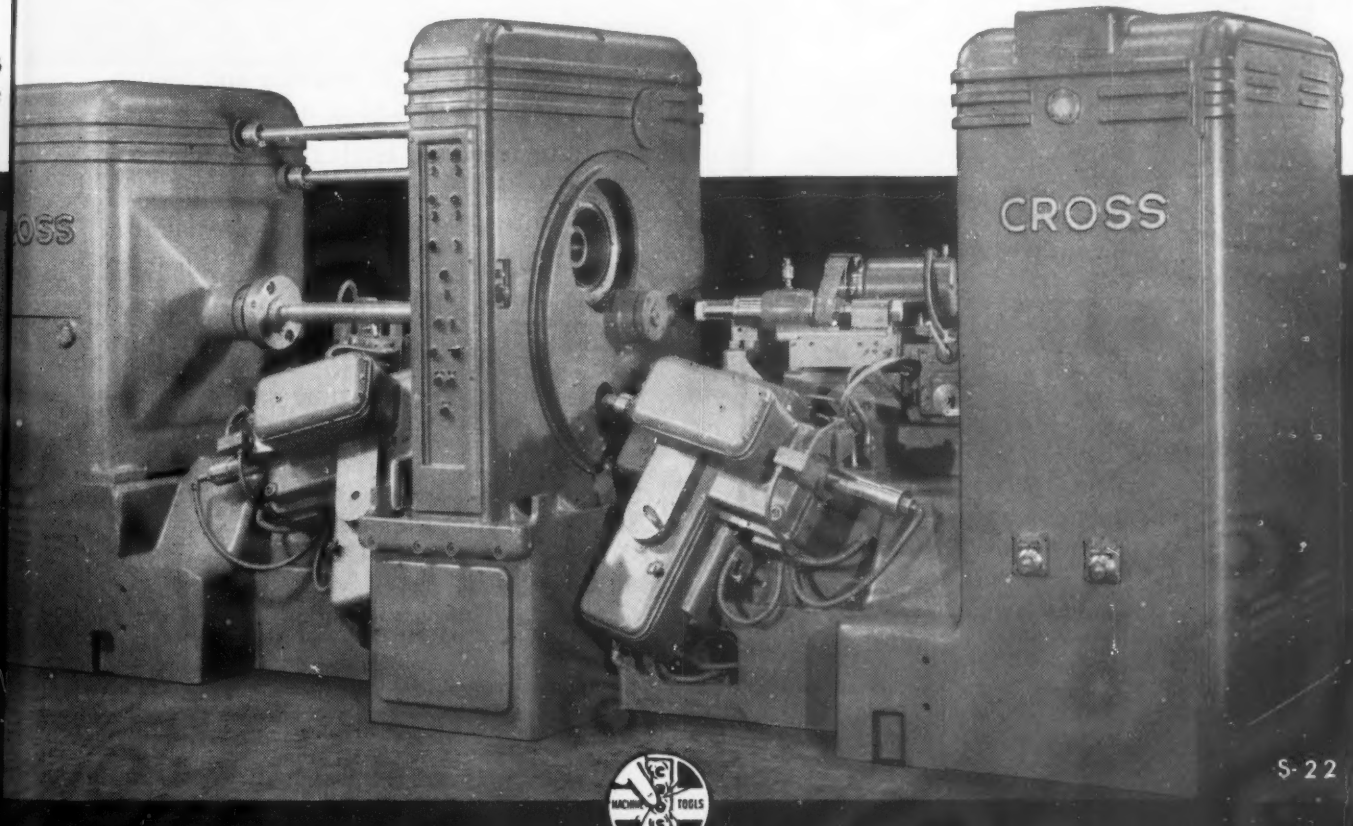
New York • Chicago • DETROIT • Cleveland • Cincinnati



4 THE MACHINE

A 4-spindle Cross Special Machine with a 3-station trunnion type fixture first indexed the work-piece between two opposed grinding heads and next between two opposed honing heads. All four heads operate simultaneously to grind and hone both bearings at opposite ends of the hubs. The trunnion then indexes to a third station for unloading and reloading the hubs. Production is at the rate of 50 hubs an hour, automatically machines to an accuracy of 3-micro inch surface finish.

Cross Special Machines have proved their economy in operation and are a means whereby a substantial profit will be possible in the highly competitive postwar market. May we help you prepare for it? Write The Cross Co., Detroit 7, Mich., Dept. 154.



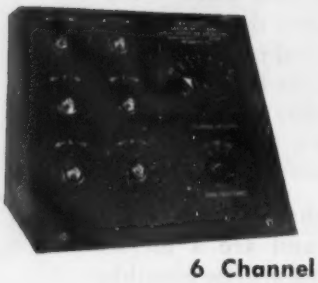
S-22

SPECIAL MACHINES

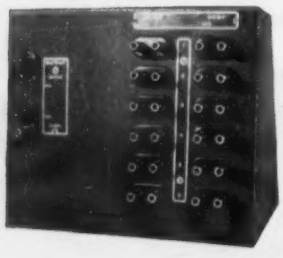
for automatically performing any one or a combination of metal cutting operations
TURNING · MILLING · DRILLING · BORING · REAMING · TAPPING · GRINDING

SR4 Switching and Balancing Unit

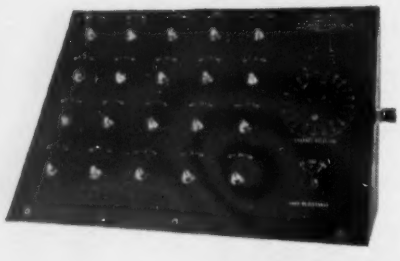
SR4 Trade Mark Reg. U. S Pat. Off.



6 Channel Switching and Balancing Unit . . $1950.00



12 Channel Switching and Balancing Unit . . $2950.00



20 Channel Switching and Balancing Unit . . $4300.00

20 Point Switching Only Unit $865.00

NEW! LOW PRICES!

The problem of increasing the serviceableness of the SR-4 strain gages without multiplying the indicating devices is best solved by the use of switches. However, ordinary switches in usual circuits will not serve because contact resistance variations introduce uncontrollable errors whose magnitude may be of the same order as that of the quantity being measured.

Therefore, the SR-4 switching and balancing units shown have been designed to serve the strain gage user. High grade switches are used in circuits designed to minimize the effect of contact resistance and provision is made for convenient means of balancing several strain gage circuits to a common datum line prior to the start of the test.

These units are real time savers and no user of gages should be without them.

The Baldwin Locomotive Works, Baldwin Southwark Division, Philadelphia 42, Pa., U.S.A. Offices: Philadelphia, New York, Boston, Chicago, St. Louis, Washington, San Francisco, Detroit, Cleveland, Houston, Pittsburgh.

BLW THE BALDWIN GROUP

BALDWIN

TESTING EQUIPMENT

GET GREATER PRODUCTION AND ACCURACY ON MILLING BORING AND DRILLING . . . WITH THIS AUTOMATIC INDEX BASE

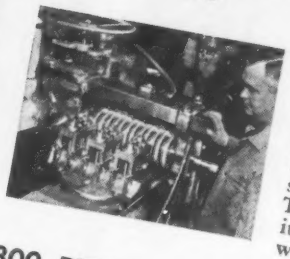
Here's a fast automatic index base that eliminates extra handling in repositioning parts for multiple cuts — has "built-in" accuracy for continuous reproduction to close limits — is thoroughly sealed against dust, chips, or oil — ideal for both "dry" and milling requiring coolant.

ACCURATE TO WITHIN .001″ ON PERIPHERY

Spacing is controlled by indexing plunger which registers in accurately machined notches cut in the master plate. Notches are cut to provide accuracy within .001″ on periphery of top plate.

● HOW TO APPLY THIS INDEX BASE TO YOUR WORK . . . Get our booklet covering the complete specifications of 8″, 12″, 18″, 24″ and 30″ diameter automatic index bases. Typical applications, production applications and design details are also included. Write for your copy today. Ask for bulletin #738.

3 Typical Installations

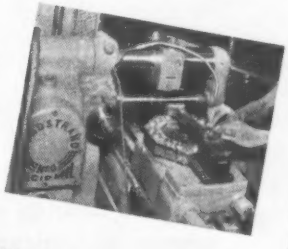


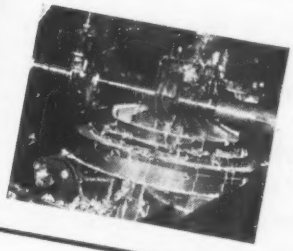
40% PRODUCTION INCREASE

Straddle milling two flats on both ends of this camshaft was increased 40% with a Sundstrand automatic index base. Two stations (180° index) make it possible to mill both ends without re-locating part.

800 PIECES MILLED PER HOUR

An eight station automatic index base eliminates "down-time" on this slotting operation. Operator loads and unloads parts during automatic cycling of machine.





INSURED ACCURACY

Accurate milling of this part is obtained with a 16 station automatic index base.

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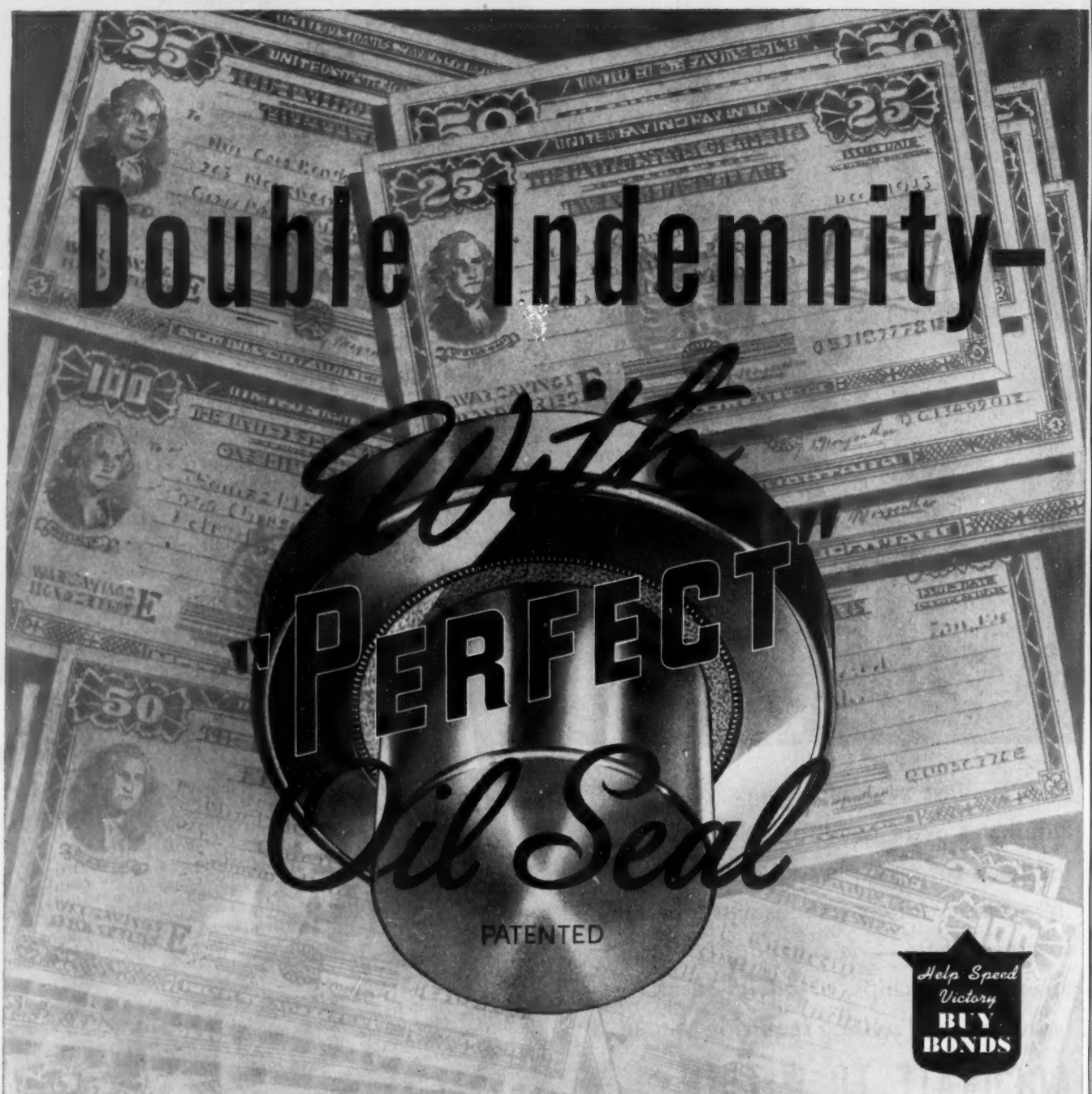

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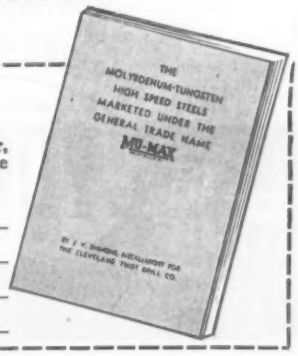

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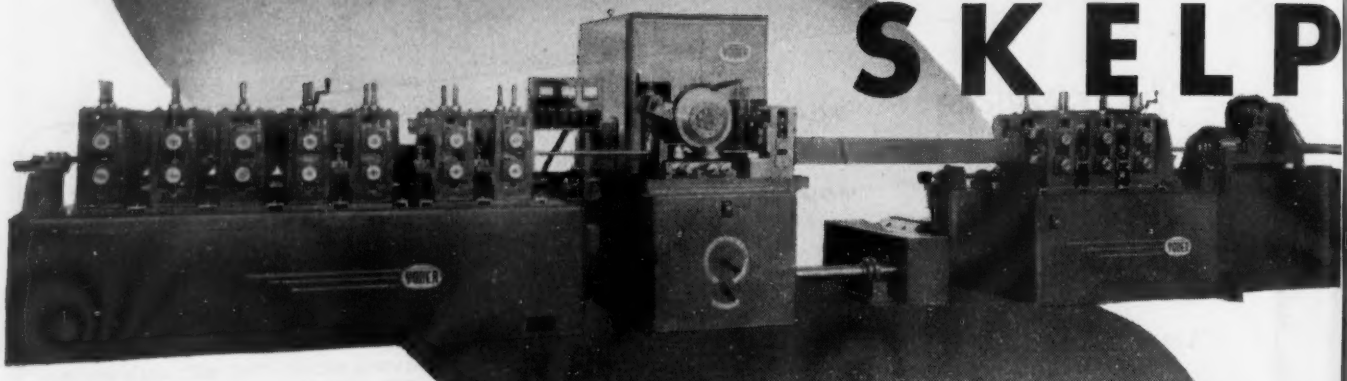

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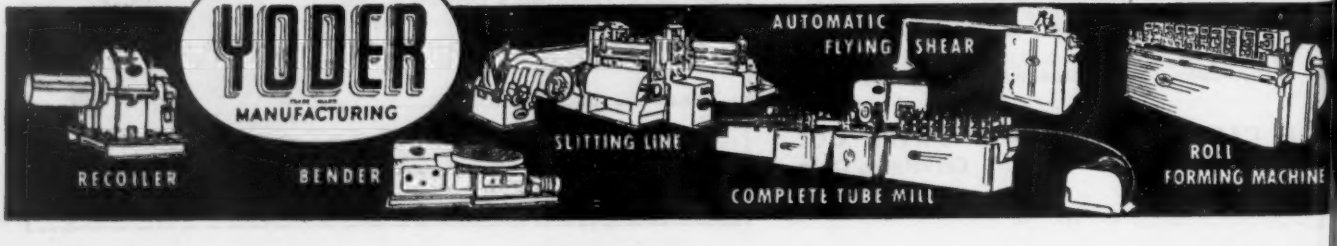

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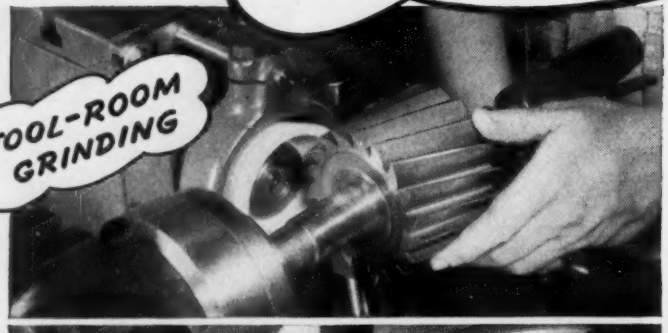

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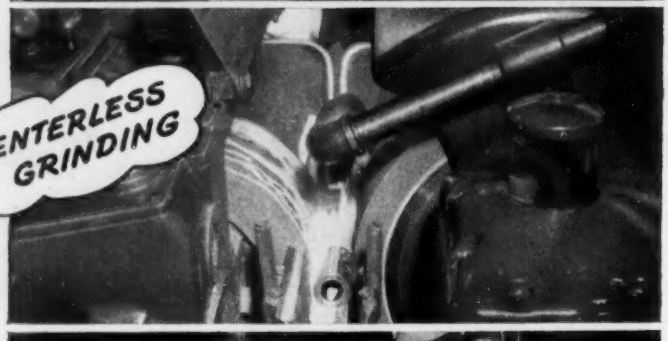

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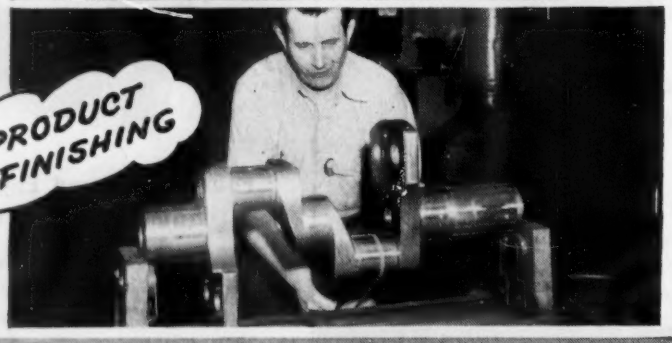

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Less time to machine and finish.

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Forgings facilitate rapid assembly through a welding adaptability of widest range.

•

Forgings reduce accidents to men and machines; provide a greater margin of safety.

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Forgings can take it; maximum strength and toughness through a concentration of fibre-like flow line structure at points of greatest shock and stress.

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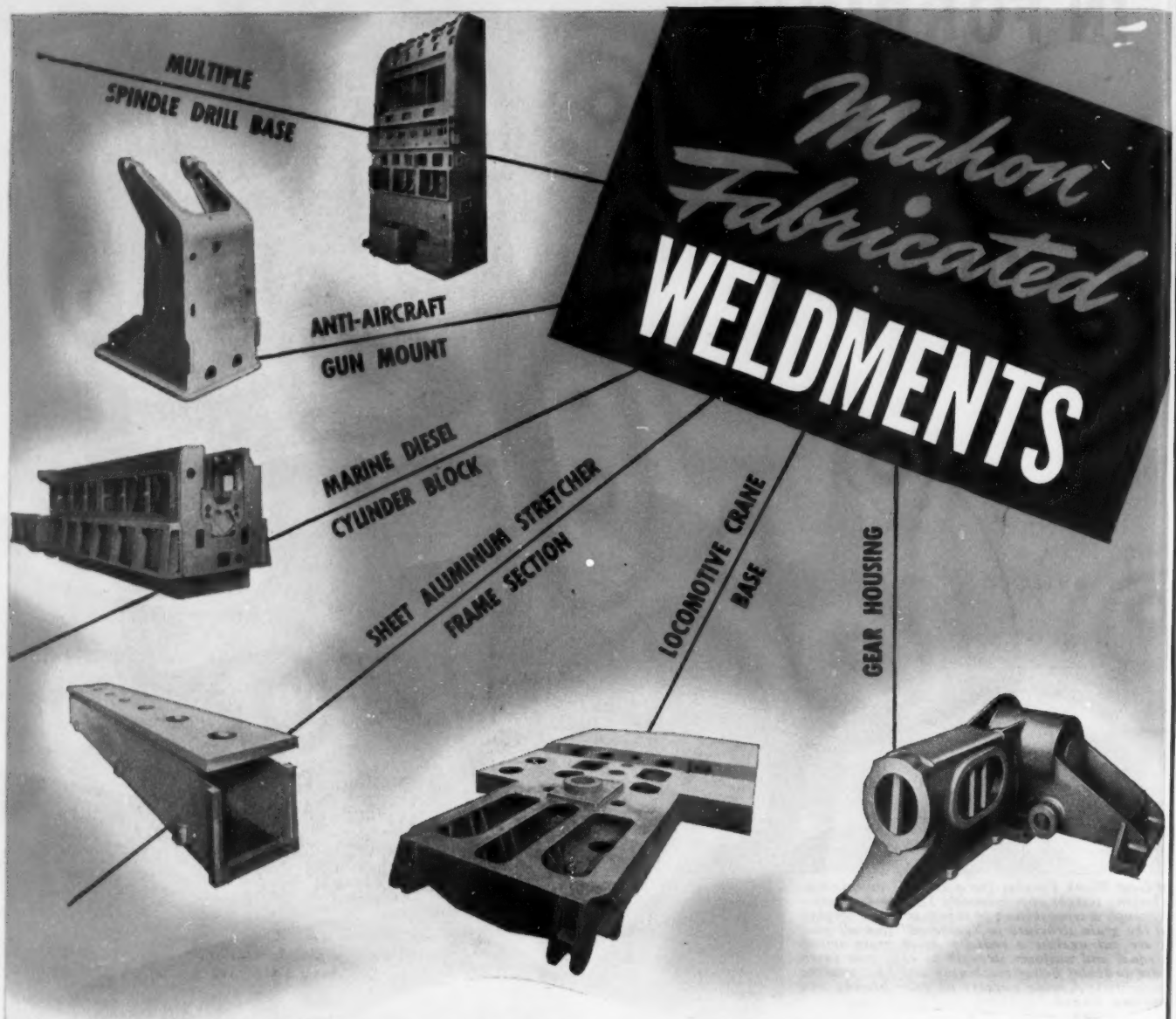

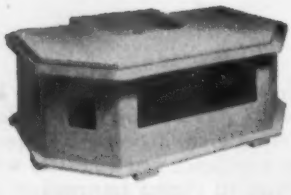

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STEEL

The Magazine of Metalworking and Metalproducing

Vol. 117, No. 1 July 2, 1945

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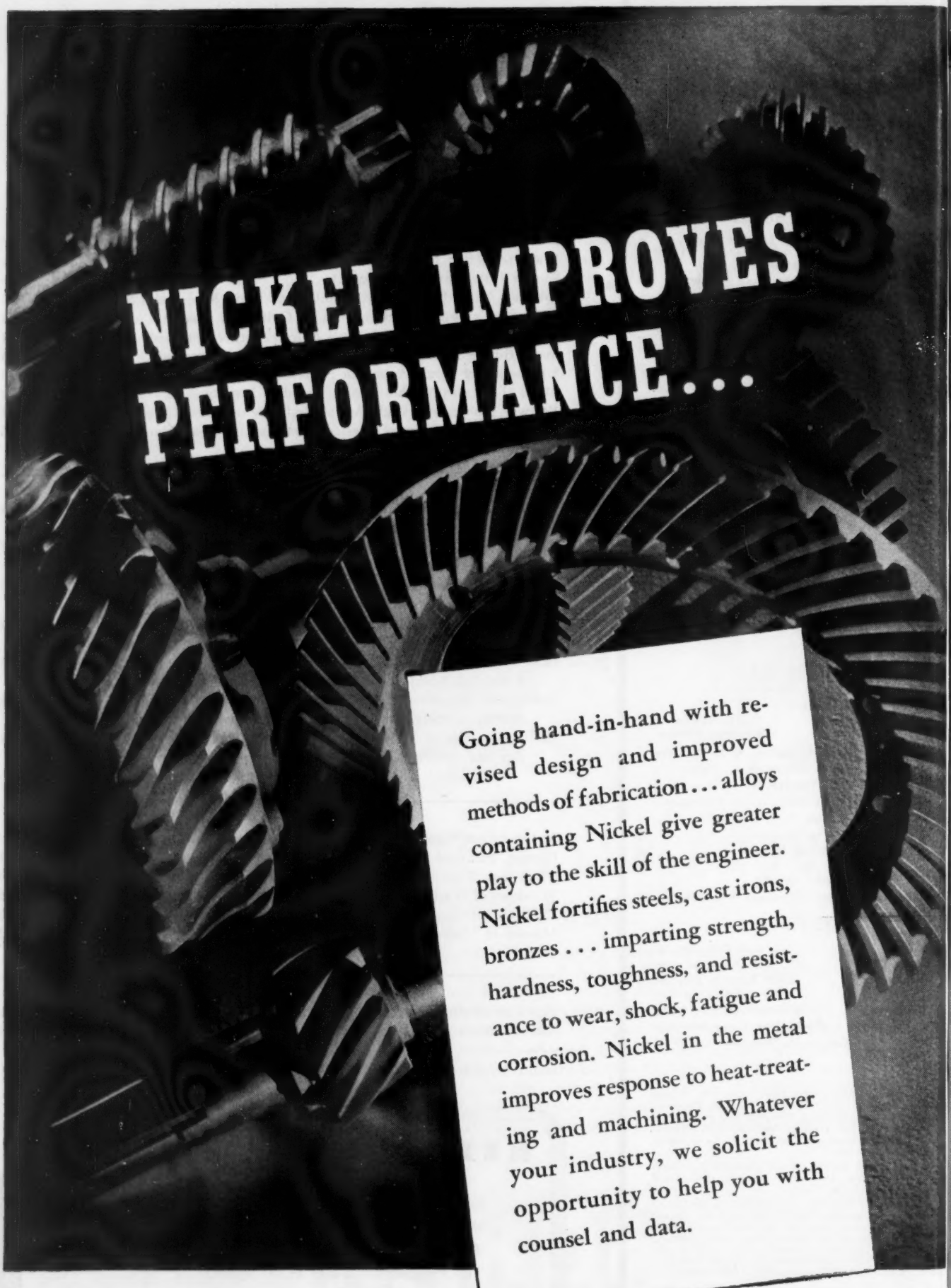
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STEEL
July 2, 1945

Good Will, Good Faith!

Signing of the charter for a world organization for peace by the representatives of 50 nations at San Francisco on June 26 was an event which may have a tremendous influence upon the future of American industry.

To fully appreciate its potentialities in this respect, one may well compare the circumstances surrounding the world charter with those under which the Constitution of the United States was adopted.

In 1787 a convention of 55 members worked strenuously for 85 days to draft a constitution for the young republic. The document they adopted on Sept. 17 was none too popular. Only three of the 13 states ratified it unanimously, four endorsed it by heavy and four by light majorities and two refused to ratify until after its general acceptance. So marked was dissatisfaction that John Adams declared it was "extorted from the grinding necessity of a reluctant people." Historians record that only the "commercial classes" endorsed it wholeheartedly.

Yet from this inauspicious beginning the American Constitution has become the marvel of the world. Gladstone appraised the job of drafting it as "the most wonderful work ever struck off at a given time by the brain and purpose of man." That through a century and a half the instrument has withstood shocks that have destroyed scores of other governments and has guided the republic into undisputed first rank among the nations of the world more than justifies this glowing tribute.

Today the charter drafted at San Francisco stands before the world in much the same uncertain position that the American Constitution stood before the young republic in 1787. If anything, it has more support and faces less antagonism than did the Constitution. It can remain a mere scrap of parchment, or like the Constitution, it can become a powerful instrument for good.

It will succeed or fail according to the support given it by the people of the sponsoring nations. As Field Marshal Jan Christian Smuts put it so ably, the charter will prevail to the extent to which international good will and good faith make it effective.

We hope that business and industrial executives will exert their influence toward promoting this vital good will and good faith. How wonderful it would be, if a century hence, historians could record that industrial leaders were among the first to support the charter wholeheartedly, just as historians now say that the "commercial classes" were the first to favor heartily the now revered Constitution of the United States!

POLICY INCONSISTENT: Confusion reigns on the labor front. More than 100,000 men are idle as the result of numerous strikes, many of which arise from jurisdictional or trivial disputes.

Some labor union leaders are condemning these work stoppages as "unauthorized" and in at least one instance the international president of a union resorted to ads in local newspapers to plead with strikers to return to work. Several high-up union officials have expressed concern that the present wave of reckless strikes will incite a violent public reaction against union labor.

If this concern is real and sincere, why are union leaders so inconsistent in their attitudes toward measures which would discourage outlaw work stoppages? At the same time that Frankensteen, Dalrymple and other CIO heads are urging strikers to come to their senses, "CIO News," the official weekly publication of CIO, is running stories which are certain to make members jittery about their jobs

(OVER)

and to provoke them into hot-headed action. Also CIO, AFL and UMW are inconsistent in their too hasty and too vehement attacks upon the Ball-Burton-Hatch bill, which would help curb the very "unauthorized" strikes union heads condemn.

In this critical time in labor relations, a more consistent policy on the part of top union officials would help tremendously. —p. 60

• • •

TIMELY CONFERENCE: According to the Combined Production and Resources Board, a four-week conference will be held in Canada this fall at which representatives of the United States, Canada and Great Britain will discuss long-standing differences in Anglo-American engineering practices and standards of measurement.

This latest effort to unify standards may achieve greater success than has rewarded previous attempts because the experience of the war and the present emphasis upon closer co-operation among nations in the postwar period point more clearly to the dire need of such unification. It is estimated that the differences in the design of American and British screw threads alone have added $100 million to the cost of the war. If the cost of differences in pipe threads, limits and fits, drafting practices, units of measurement and other essential factors could be calculated, the total would be astounding.

The Canadian conference would seem to be timed nicely for more favorable progress. —p. 70

• • •

CHOOSING PLANT SITES: Chairman Irving S. Olds of United States Steel Corp. told a press conference in Chicago that the guiding principle of the corporation in its postwar building will be to follow the market. "As the market for steel shifts, the corporation will shift facilities. As new facilities are needed, they will be located near the market."

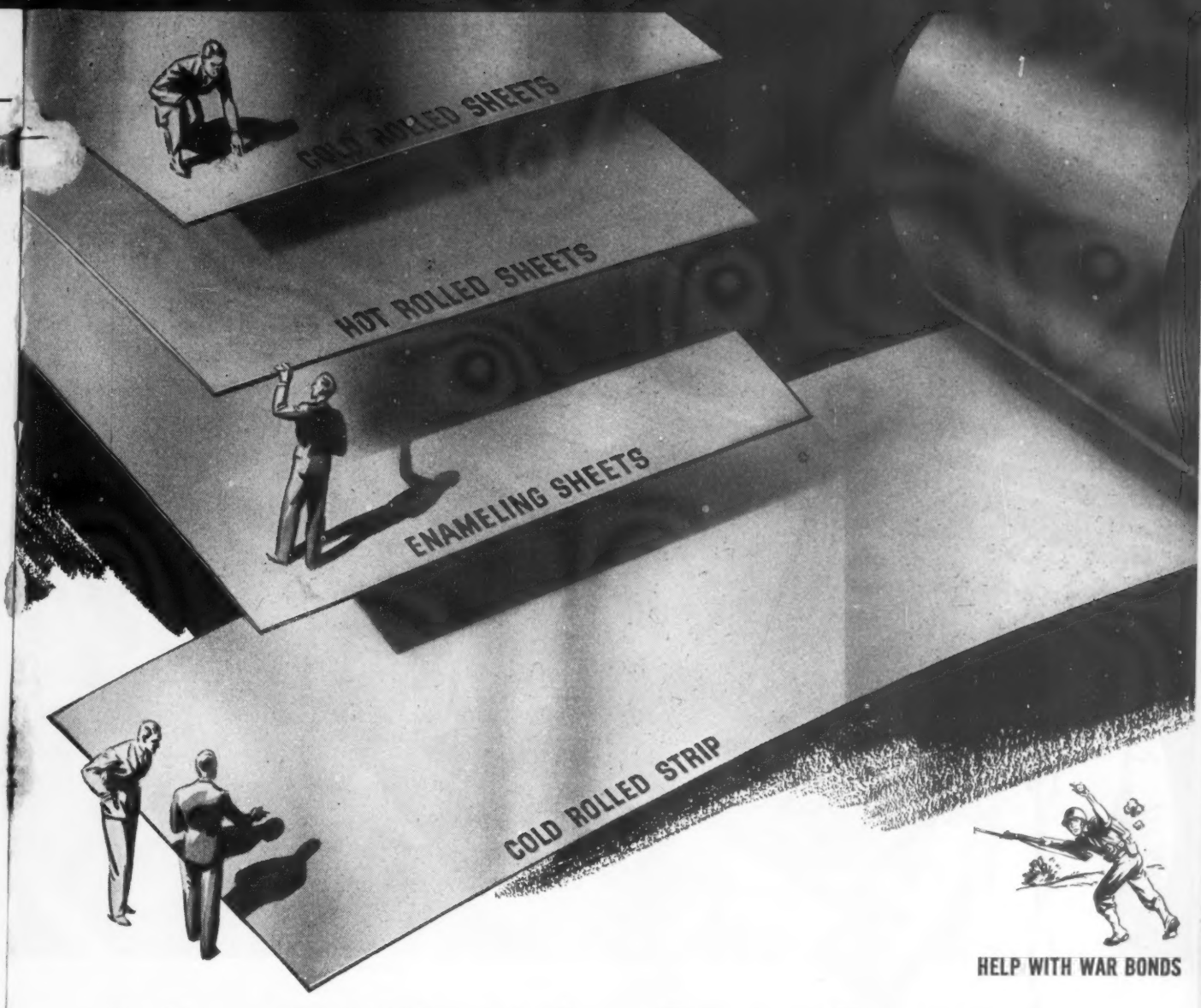
While this is not wholly a new policy, it does represent a departure from the one-time strongly held concept that a big plant should be near its sources of raw materials. It is quite certain that most producers and manufacturers in considering sites for facilities will be more market-conscious.

Also, many manufacturers will place more emphasis upon the environment of new plants. Some corporations are beginning to check the civic life, opportunities for recreation, standard of schools and churches, cultural background and quality of citizenship in localities where they expect to build plants. This is a healthy sign. —p. 64

SIGNS OF THE TIMES: Bernard Baruch, Leo T. Crowley and Will L. Clayton recommend that the United Nations do a thorough job in depriving Germany of any opportunity to mobilize her economic resources for future aggression. Mr. Baruch advocates (p. 57) removing to friendly countries or destroying certain German plants, strict control of her exports and uprooting German assets and business organizations all over the world. Mr. Crowley warned the Senate Military Affairs Committee (p. 58) that if Germany were left alone for five years, she could become better prepared for war than she was in 1939. Mr. Clayton announced State Department proposals (pp. 58, 59) that German participation in all cartels be terminated and that all business communications to and from Germany be placed under military surveillance. . . . The Pepper report of a subcommittee of the Senate Small Business Committee estimates that on the basis of a gross national income of $170 billion a year, exports "should be on the order of $10 billion or one-seventeenth." "Such an export program," the report says (p. 66), "should mean steady jobs for more than 5 million people in direct export industries." Some industrialists will ask how one can balance $10 billion exports against imports most recently estimated at not over $5 billion. . . . Lt. Gen. W. S. Knudsen's home coming to Detroit was a memorable affair. Gen. George C. Marshall and Under Secretary of War Robert P. Patterson (p. 73) paid richly deserved tributes to his success as the nation's No. 1 production trouble shooter. . . . Directors of the Wickwire Spencer Steel Co. have received a proposal (p. 64) to merge the company with the Colorado Fuel & Iron Corp. . . . Nucleus of a Seabee machine shop on Saipan is a Japanese milling machine, drill press and two lathes (p. 102), which were wrecked deliberately by the retreating Japs, further damaged by the shellfire of the advancing Yanks and finally rebuilt by the Seabees. . . . Because distances are so great and time so precious in the war of the Pacific, every effort is made to do as much repair and maintenance work as possible at advanced bases (p. 62) and to send a minimum of jobs to the mainland. In a recent tour of Pacific bases, Editor E. C. Kreutzberg inspected a number of the Navy's repair and construction depots and marveled at the versatility of their facilities.

E. C. Shaner

EDITOR-IN-CHIEF



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Break-up of Nazi Industry Urged

Policymakers recommend plants be moved to friendly countries, dismantled or operation and distribution of production rigidly controlled to eliminate Germany's war potential. Secret technology to be unveiled

Removal or destruction of Germany's heavy industry to break that country's dominance of Europe was recommended to the Senate Military Affairs Committee by Bernard M. Baruch. NEA photo

WHILE United States and Allied policy on the disposition of German heavy industry still is in the formative stages, declarations by leading policymakers indicate her large industry units will be broken up, shifted to friendly countries or kept under long-term Allied control. German industry in foreign countries will be rooted out and its ownership transferred. German technological data, admittedly advanced and much of it secret, will be unveiled and made available for the use of all peaceful nations.

Primary purpose of this policy will be to destroy the Reich's potential for military aggression.

A secondary result and one which will have great effect on all manufacturing countries will be a shift in world trade markets from the prewar status. Germany, through an aggressive world trade policy supported by the state and using all political weapons at her command, achieved an influence in foreign trade which was perhaps out of proportion to her economic status. Break-up of her industry and its control by the Allies will transfer many markets formerly dominated by the Germans to other countries.

Industrialists from the United States and other Allied countries already are at work studying how German industry shall be dismantled, moved or controlled. R. J. Wysor, former president of Republic Steel Corp., Cleveland, heads the Metallurgical Section of the Allied Control Council. Other experts have been or are being called in to supervise the disposition and control of raw materials and various forms of production.

One of the most comprehensive and influential recommendations for disposition of German industry has been offered to the Senate Military Affairs Committee by Bernard M. Baruch, New York financier, frequent advisor to Presidents and often called this country's "elder statesman."

Mr. Baruch said the United Nations should smash Germany's war potential by removing to friendly countries or destroying her plants and factories. He also called for strict control of her exports; breaking up of the junkers' estates; uprooting of German assets and business organizations all over the world.

Through "priorities for peace" to the peoples which Germany tried to destroy, Mr. Baruch recommended the building up of the strength of the United Nations in both Europe and overseas while reducing Germany's overall industrial and technical power. "Only when such a new equilibrium is established will it be safe to readmit Germany to the family of nations."

Mr. Baruch placed security above reparations in his recommendations to the committee. "Reparations should be fixed at the maximum within Germany's capacity to pay, consistent with security and not to undercut living standards by forcing exports. Russia and other countries are entitled to labor reparations, particularly if they will include in their labor battalions the principal warmakers—the Nazis, the Gestapo, junkers, the general staff, geopolitikers, war industrialists and war financiers — leaving the ordinary workers and peasants."

When defeat became certain, Mr. Baruch reminded the senators, many of

Germany's junkers, Nazi leaders and war industrialists "sneaked abroad assets of every type as reserves for that day in the future when they could try it again. German business abroad has traditionally been an instrument of economic and propagandistic war. These assets and organizations should be rooted out and taken over — everywhere. No hocus-pocus. No falling for dummy contrivances. If necessary to make sure that these properties really change hands, I would set up a corporation to finance such transfer."

Enemy assets in each country should be used to make restitution to the nationals of that country for properties lost or damaged in enemy countries, Mr. Baruch suggested. In the United States the value of German properties taken over by Congress would be pooled and from this fund Americans with property in Germany or her satellites would receive restitution. Anything left after these claims are met would be turned into a common pool to pay for the necessary German imports, with the remainder going as reparations. This will make possible the deindustrialization of German heavy industry even where American or other foreign-owned plants are involved.

On the matter of cartels, Mr. Baruch believed the proposal that all international agreements entered into by American firms be registered with the government (State Department) would be welcomed by business men. Such a law would free them of danger that a business act taken in good faith in one year could be accused against them years later, possibly under changed international conditions.

"Will the State Department or any other agency that is set up to handle such registrations know which agreements are in the national economic interest and which are not?" Mr. Baruch wondered. "Do we have enough of a positive foreign economic policy in this country?

"This question goes beyond patent matters. Are American business men to be encouraged to invest abroad and to widen their exports and are their interests to be protected by the government or discarded? What if we grant government credits to a country like Soviet Russia? What becomes of little business if it has to face an import and export monopoly of another government? Under the Bretton Woods agreements are loans to be made to countries which may evade the agreements through cartel-like methods?

"I do not want to seem to leave you in confusion on this matter. What I am trying to get across is that there has been too much discussion of this question without regard to the part it plays in the broader picture of the need for a coherent American foreign economic policy, which we still lack."

Leo T. Crowley, foreign economic administrator, warned the committee that if Germany were left alone for five years the Germans could become better prepared for war than they were when they invaded Poland in 1939. Allied bombings did not reduce German plants to ruin, asserted the FEA head.

"In late 1944 the German nation achieved the highest level of production in its entire history."

Mr. Crowley believed the Allied powers must institute a rigid control over German industry and prepare for a long-term occupation.

State Department plans to prevent Germany from "rebuilding abroad" were unfolded by Will L. Clayton, assistant secretary. The department has, he said, abundant evidence that the Germans already are seeking to hide capital abroad and to rebuild economically behind "ghost" industries and try again for a position of dominance.

Hunt Hidden German Assets

The United Nations are embarked on a search for all German assets and business intrigues, Mr. Clayton said, adding that German economic and political infiltration in South America already has been dealt a "blow from which it probably will never recover."

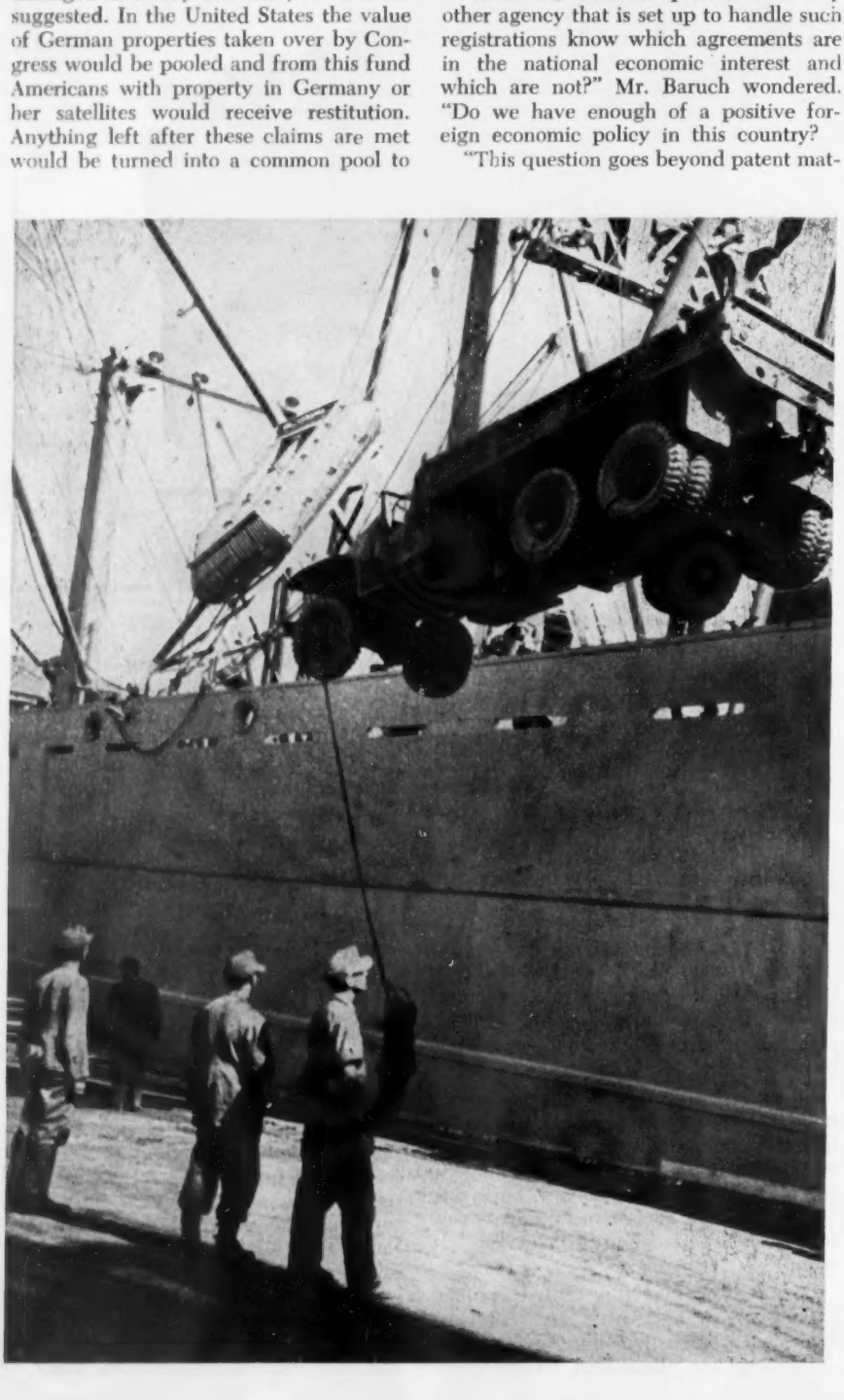
Mr. Clayton said the State Department proposes the following actions:

Termination of German participation in all cartel contracts.

Registration of all cartel arrangements in effect in Germany after 1933.

Establishment of a system placing all business communications to and from Germany under military surveillance.

Mr. Clayton disclosed the United States and Great Britain have sent missions of industrial experts to Germany to "ac-



German prisoners of war watch from the foreground as a Tokyo-bound Army truck is hoisted aboard a transport at a staging area north of Marseille, France, where men and machines are being impressed for duty in the Pacific. NEA photo

Demobilized German soldiers above will be sent to farms to help ease the Reich's food shortage. No Nazi party men or SS troops are being demobilized. British official photo from NEA

quire all technological information which could be used in the prosecution of the war against Japan." Seizure of German patents is expected to deprive Germans of the technological assets which were the main inducements for others to join Nazis in international cartels.

One study of Germany's technological data, the manufacture of synthetic liquid fuel, already has been made by an American mission of experts. Dr. W. C. Schroeder, acting chief of the Bureau of Mines office of synthetic liquid fuels, and a member of the mission, reported many secret Nazi records, blueprints and documents relating to their latest discoveries in this field had been unearthed.

Pending decision on Allied policy on German industry, the Reich's plants are largely closed down. They are being permitted to produce only those products which are needed by the Allied forces or which are considered essential to maintenance of the minimum standards for the German civilian population. This limited production by German plants, however, is permitting the transfer of vast quantities of Allied materiel in the European theater to the Pacific.

French Steel Prices Are Increased Sharply

Prices for steel products in France were advanced May 1, following a 30 per cent increase in wage rates. In some cases steel prices were doubled and in all instances the increases were sharp. Prices follow:

	New Price	Previous Price
	(Francs per Metric Ton)	
Billets	3,580	1,095
Rails	5,789	3,057
Beams	4,499	2,395
Merchant bars	4,700	2,501
Plates	5,789	3,087
Medium sheets	6,353	3,378
Light gage sheets	7,013	3,717

Earlier it had been decided to restart about ten blast furnaces in northern and eastern France, and a provision for coke had been made. However, strikes in the coal mines of Belgium and northern France have prevented these plans from materializing.

Output of coal in the north is at the rate of 20,000 tons per day as against 100,000 tons before the war. Supp'ies from the Saar, at the rate of 15,000 tons per day and 10,000 tons from Belgium, were to be received, but these tonnages have not been reached.

French iron and steelworks are much affected by the coal situation and a considerable number of workers are idle.

Present, Past and Pending

■ CALVIN VERITY NAMED PRESIDENT OF RUSTLESS IRON

BALTIMORE—Calvin Verity has been elected president of Rustless Iron & Steel Corp., this city, succeeding Charles R. Hook who will continue as chairman of the board. W. W. Sebald, a director, has been elected first vice president.

■ DETROIT STEEL PRODUCTS BUYS BUFFALO PLANT

BUFFALO—Detroit Steel Products Co. has purchased a plant here for postwar production of prefabricated metal building materials. Total cost of the project, including installation of machinery, will approximate $500,000, H. F. Wardell, president, said.

■ HOLT, ALA., BLAST FURNACE FACILITIES CHANGE HANDS

BIRMINGHAM—De Bardeleben Coal Corp., this city, has purchased the Holt, Ala., blast furnace properties of Tennessee Coal, Iron & Railroad Co., and has, in turn, sold the blast furnace installations to Charles Temerson & Sons, Tuscaloosa, Ala., for dismantling. De Bardeleben will retain a portion of the 51 acres for future expansion of its coke oven operations; Southern Products Corp. has purchased a portion as a site for its chemical plant, being moved from Tuscaloosa.

■ NEW STANDARD ISSUED FOR ACME SCREW THREADS

NEW YORK—American Standards Association has issued a new American war standard for acme screw threads. It probably will become a national standard in Great Britain and Canada, as well as this country.

■ WHITING CORP. SPLITS STOCK; ELECTS NEW OFFICERS

HARVEY, ILL.—Whiting Corp. stockholders have approved split-up of stock on a four for one basis. Gen. Thomas S. Hammond was elected to the new office of chairman of the board and Stevens H. Hammond, president. D. Polderman Jr. was elected vice president and export manager with headquarters in New York.

■ WPB LIFTS RESTRICTIONS ON HARD GOODS

WASHINGTON—All War Production Board orders restricting production of hard goods such as trucks, passenger automobiles, mechanical refrigerators and similar goods were either revoked or made subject to the spot authorization procedure in a WPB move last week. Open-ending of CMP went into effect July 1, this permitting manufacturers to obtain steel and other raw materials for civilian goods manufacture.

■ U. S. STEEL SETS UP NEW SOUTHERN SALES PROGRAM

BIRMINGHAM—All sales of Carnegie-Illinois Steel Corp., American Steel & Wire Co. and Tennessee Coal, Iron & Railroad Co. in 11 southern states will be handled by the latter company.

War Production Hit by Strike Wave

More than 100,000 workers idle over nation in current rash of walkouts. Work stoppages doubled since V-E Day

WAR production is being seriously interfered with over a wide area of the industrial front as the rash of strikes experienced since V-E Day continues to spread. Scores of work interruptions and walkouts were reported in effect throughout the nation last week involving, it was estimated, more than 100,000 workers.

Indications point to continuing labor trouble as the summer progresses and tension over wages and other considerations mount in step with cutbacks in the war production program. As a general thing, the present work stoppages are in line with expectations of last spring when war production programs were just beginning to be cut back on an expanding scale.

Current walkouts are immediately traceable to a number of factors. Jurisdictional disputes between CIO and AFL unions are prominent but many of the strikes also stem from such trivial causes as late arrival of pay checks; failure of plant caterers to provide sandwiches containing meat; wives making more money than their husbands in the same plant; and prohibition of lunch-hour checker games. Most of the strikes, it appears, were called without resort to established machinery for settling grievances.

While such grievances as the foregoing were ascribed as the immediate cause of many of the walkouts, the real cause for the widespread labor unrest goes deeper. Fundamentally the trouble is believed symptomatic of the fear of idleness and shortened take-home pay expected to follow in the wake of war order cutbacks. In other words, labor appears to have cutback and reconversion jitters.

The seriousness of the labor troubles now plaguing the nation can be judged from the fact that the Conciliation Service of the Labor Department reports strikes have doubled in number since V-E Day, averaging between 35 and 50 a day as compared with a peak of 20 daily reported during the European war.

Striking Briggs Mfg. Co. aircraft plant workers line up at the Detroit Office of Price Administration to protest the absence of meat in their sandwiches. NEA photo

Pickets scatter in all directions after Elkhart, Ind., police use tear gas to rout the picket line at Northern Indiana Brass Co. after strikers attempted to bar non-striking employes. Company makes submarine fittings and valves for B-29s and has been closed since June 2. NEA photo

At Detroit, major war production center of the country, the strike situation was extremely acute last week. It was reported at midweek that some 300 plants in the area were threatened with labor trouble as the result of a dispute between CIO and AFL unions striving for work preference. Idle in the district at mid-week were some 60,000 workers, including 22,000 employes of Packard Motor Car Co., 21,000 being production men employed in the manufacture of marine and aircraft engines; 7500 Budd Wheel Co. workmen and 145 men on construction projects at the plants of the Chrysler Corp.; 7500 Ford Motor Co. workers at the Rouge plant, affecting operations in the spring and upset shop and the rolling mills. At three plants of the Hudson Motor Car Co. work on parts for the B-29 Superfortress and Curtiss-Wright Helldiver planes was hindered by walkout of an estimated 550 employes in various departments who joined 100 hourly workers who had been on strike since the week preceding. This dispute centered in assignment of certain work in the plants. Also 500 workers were reported idle at the Stinson Aircraft plant, another 975 at the Aeronautical Products Corp. plant and 700 in 12 retail lumber company yards.

Elsewhere on the labor front outstanding work interruptions included continuance of the strike of 16,700 workers at five Goodyear Tire & Rubber Co. plants in Akron, O., the strikers being in a deadlock with the National War Labor Board which has been seeking to effect

a settlement; walkouts of 1000 workers at the Acklin Stamping Co. and the Mather Spring Co. in Toledo, O.; 1000 out at the Anchor Hocking Glass Co., Connellsville, Pa.; 2700 at the Carter Carburetor Co., St. Louis; 500 at the Houdaille-Hershey Co., Decatur, Ill.; 2500 at the Mack Mfg. Corp. plant in New Brunswick, N. J.; 8000 from six plants of the Pittsburgh Plate Glass Co.; 7000 from four Libbey-Owens-Ford Co. plants. Still other strikes included employes at the H. K. Porter Co., Pittsburgh, 1500 Woonsocket, R. I. textile workers, 700 workers in California canneries and a strike at the plant of the Northern Indiana Brass Co., Elkhart, Ind. This latter plant has been closed since June 5.

Current widespread strikes are but the mushrooming out of labor disorders that have marked the period since V-E Day. Some of these post V-E Day strikes have been of short duration, others have extended over several weeks. In the iron and steel industry some serious interruptions in production have been experienced in such centers as Chicago, Pittsburgh, Birmingham, and Youngstown.

Approximately 3300 tons of steel ingot production was lost early last week at South Chicago works of Carnegie-Illinois Steel Corp., when operations in No. 3 open-hearth shop and the bessemer department were affected by a 30-hour strike, the 200th which the company's Chicago district plants have suffered since Pearl Harbor. The work stoppage was caused by two motor inspector helpers, members of Local 65, United Steelworkers of America (CIO), quitting over dissatisfaction with a rearrangement of their working schedules, and affecting 164 other workers.

Further Labor Trouble Pends

Indications that still further labor trouble is in the offing is seen in the report that upward of 20,000 additional workers either have scheduled strike votes or have granted their leaders authority to stage a walkout.

The 11-day strike of union truck drivers in Chicago was nearing an end last midweek when members of the Chicago Truck Drivers Union (Independent) voted to obey a back-to-work call of its executive committee. Members of Local 705, International Brotherhood of Teamsters (AFL), the other union involved, already had resumed work in large numbers. Prompt taking over of truck lines by the ODT, and use of Army troops as drivers and guards were important factors in breaking the strike.

That the situation may become worse before the complete pattern for handling labor and wage problems incident to reconversion is ready is widely recognized. Government officials are frankly apprehensive and are making some gestures to mollify workers. Last week, for instance, William H. Davis, director of the Office of Economic Stabilization, revealed that

(*Please turn to Page* 181)

May Pig Iron Output Shows Gain Over April

MAY pig iron production totaled 5,016,060 net tons, compared with 4,785,659 tons in April, according to the American Iron & Steel Institute. This is the second month this year in which output passed the 5 million mark.

Part of the increased tonnage resulted from the longer month, but furnaces operated at a higher rate, 87.7 per cent of capacity in May, compared with 86.4 per cent in April. May production included 83,782 tons of ferromanganese and spiegeleisen.

Total pig iron and ferroalloy output for five months this year was 24,537,271 net tons, against 26,424,993 tons in the comparable period in 1944. Details are presented in the table in net tons.

	Pig iron	Ferro, Spiegel	Total May	Total Year to Date	Per Cent Capacity
Eastern	851,863	35,342	887,205	4,397,805	80.4
Pittsburgh-Youngstown	2,025,961	24,318	2,050,279	9,876,368	93.2
Cleveland-Detroit	517,063	.....	517,063	2,509,565	92.4
Chicago	1,057,538	12,914	1,070,452	5,283,483	89.5
Southern	330,689	11,188	341,877	1,663,345	81.7
Western	149,184	.....	149,184	806,705	61.9
Total	4,932,298	83,762	5,016,060	24,537,271	87.7

April Increase in Scrap Stocks Reported

STOCKS of iron and steel scrap at plants of consumers, suppliers and producers increased slightly in April, approximating 4,907,000 gross tons at the end of the month, a gain of nearly 1 per cent over the 4,873,000 tons reported on March 31.

Consumers' stocks on April 30 were 3,710,000 tons compared with 3,646,000 tons on March 31, while combined stocks of suppliers and producers were 1,197,000 tons on April 30.

Net gain in total supplies of scrap was due to the increase of 100,000 tons in stocks of purchased scrap held by consumers. Table is in gross tons.

	Stocks at end of month			Consumption during month		
	Scrap Purchased	Scrap Home	Pig Iron	Scrap Purchased	Scrap Home	Pig Iron
Nov. 1944	4,260,000	1,364,000	1,371,000	1,849,000	2,678,000	4,363,000
Dec. 1944	4,038,000	1,297,000	1,332,000	1,912,000	2,575,000	4,428,000
Jan. 1945	3,733,000	1,290,000	1,292,000	1,933,000	2,574,000	4,385,000
Feb. 1945	3,593,000	1,308,000	1,231,000	1,836,000	2,373,000	4,043,000
Mar. 1945	3,618,000	1,255,000	1,217,000	2,141,000	2,748,000	4,647,000
Apr. 1945	3,688,000	1,219,000	1,153,000	2,096,000	2,572,000	4,270,000

Alloy Steel Production Declines in May

PRODUCTION of alloy and hot-topped carbon steel ingots in May showed a decline from April, though total steel ingot output was greater, according to the American Iron & Steel Institute.

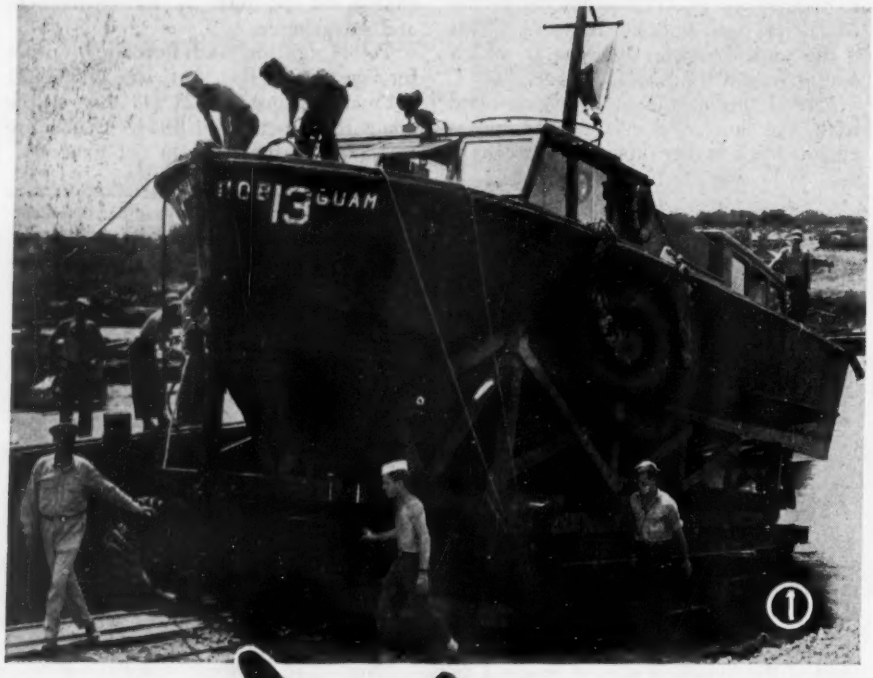
Alloy steel ingot production in May was 896,698 net tons, compared with 918,378 tons in April. Hot-topped carbon ingots made in May totaled 1,336,724 tons, compared with 1,425,564 tons in April.

In classifying alloy steel for the purpose of this report the Institute includes stainless and any other steel containing one or more of the following elements in the designated amounts: Manganese, over 1.65 per cent; silicon, over 0.60 per cent; copper, over 0.60 per cent. It also includes steel containing alloying elements in any amount specified or known to have been added to obtain a desired alloying effect.

Details of production are shown in the accompanying tabulation in net tons.

	Total Steel		Alloy Steel		Carbon Ingots
OPEN-HEARTH FURNACES	MAY	PER CENT CAPACITY	MAY	YEAR TO DATE	Hot Top MAY
Ingots	6,641,203	...	569,593	3,004,915	1,325,685
Steel for castings	21,624	...	4,155	20,932	.....
Total	6,662,827	93.2	573,748	3,025,847	1,325,685
BESSEMER INGOTS	402,100	80.6	.....	.....	.....
ELECTRIC & CRUCIBLE FURNACES					
Ingots	378,683	...	318,718	1,527,560	11,039
Steel for castings	7,193	...	4,232	24,382	.....
Total	385,876	83.2	322,950	1,551,942	11,039
Total Steel	7,450,803	91.8	896,698	4,577,789	1,336,724

Advanced Base Repair, Maintenance U



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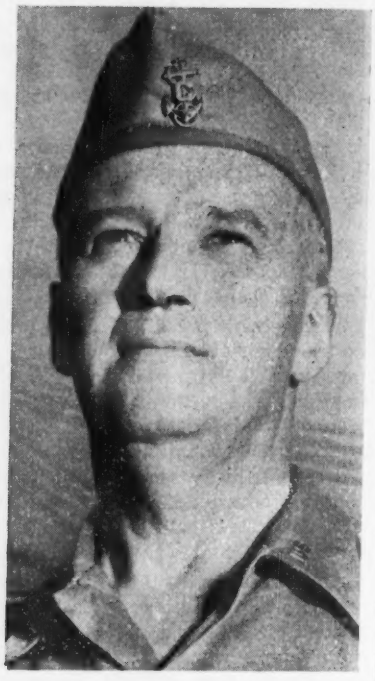

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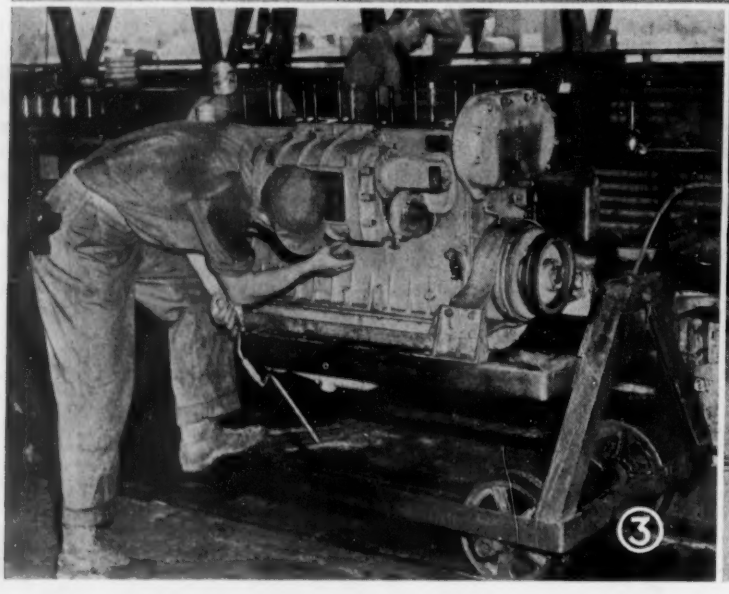
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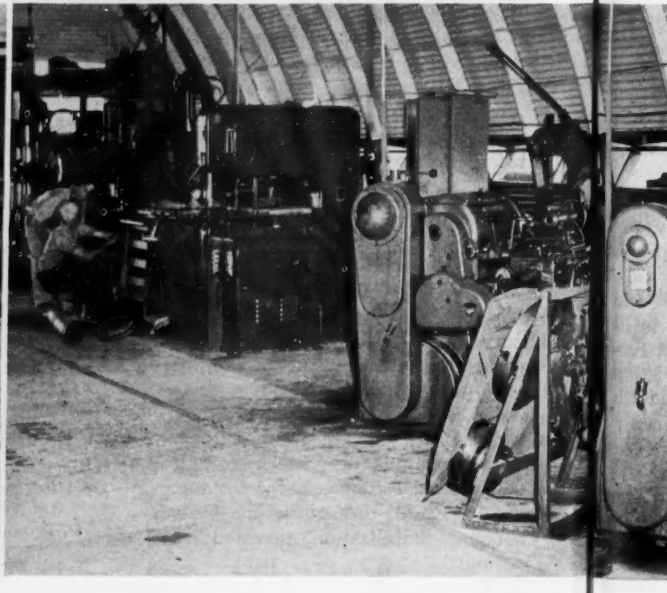


...ce Units Save Time, Shipping

REPAIR and maintenance of aircraft, vessels and other war materiel at advanced Pacific bases is one of the great problems in the war against the Japanese. Due to the long distances that must be traversed and the time consumed in crossing the Pacific, only the most seriously damaged equipment is returned to the United States for repair. To permit a major share of such work to be done at advanced bases the United States Navy has set up a number of repair and construction depots where shops are equipped to do a variety of fine-tolerance work.

Navy officers told E. C. Kreutzberg, left, editor of STEEL, who recently completed a 21,000-mile tour of Pacific bases, that an average of 120 days is required for ships leaving San Francisco for Pacific theater destinations and return. Shipping is and will continue to be a bottleneck in the Pacific war.

Pictured herewith are scenes at some of the Navy's repair installations. All photos are by United States Navy.

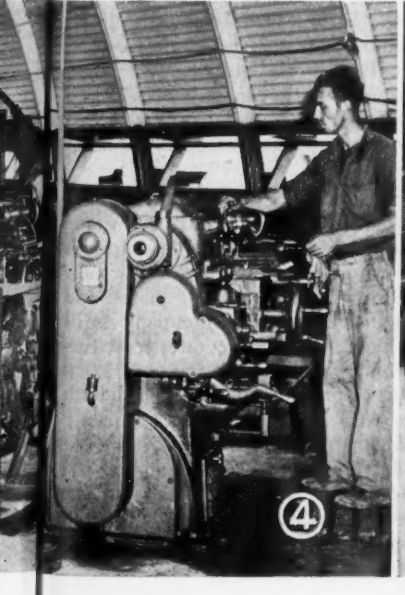
Fig. 1—Marine railway takes a small craft from the water at the Guam small boat base for repairs. Tracks for the railway were obtained from an industrial railway which formerly served a Japanese sugar refinery on Saipan. The wheels on the cars were made by cutting steel plates into disks and welding them together, using one larger disk to form the flange

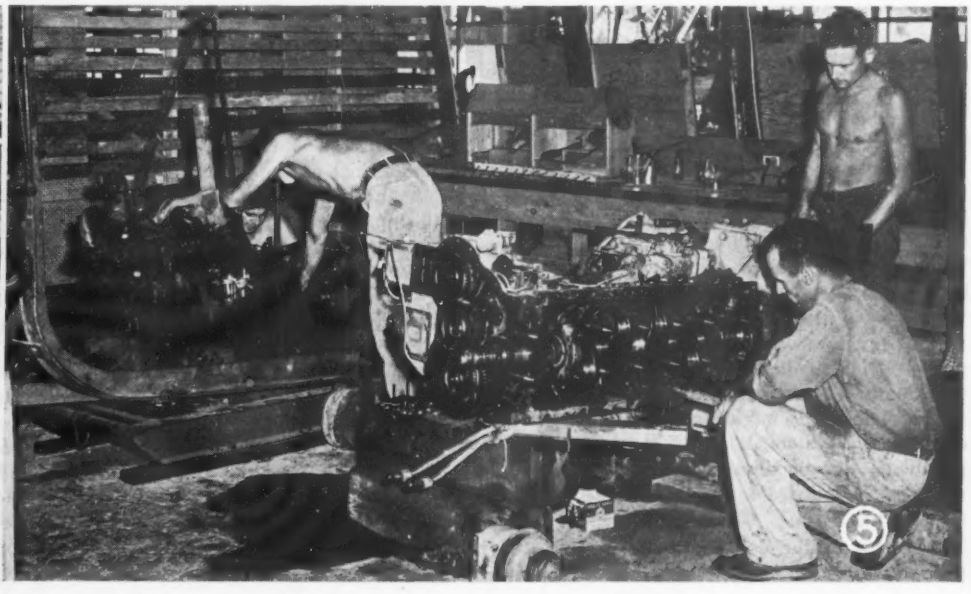
Fig. 2—Corsair fighter undergoes "depreservation" at a CASU (Combat Aircraft Service Unit) in which the protective coatings applied before shipment are removed. CASU also makes minor repairs and adjustments

Fig. 3—Internal combustion engine is mounted on special rack, taken down, rebuilt and tested in a small boat base on Guam. This base has a machine shop, ship fitters' shop equipped for bending, shearing and forming metal, a blacksmith and forge shop, electrical shop for rewinding and reconditioning motors, battery shop, and warehouses for replacement parts

Fig. 4—Machine shop at a small boat repair base equipped to perform any ordinary machining. This shop is set up in a Quonset hut and has a concrete floor

Fig. 5—Section of an engine repair shop at an advanced base construction depot. This installation carries a stock of about 75,000 items of equipment used in the construction, maintenance and servicing of advanced bases, and also about 100,000 different spare parts items





U. S. Steel's Postwar Building To Be Guided by Market Trends

Chairman Irving Olds, at directors' meeting in Chicago, states certain outmoded properties, chiefly in Pittsburgh district, will be decommissioned if corporation buys government-owned steel facilities in Utah

CERTAIN facilities, chiefly in the Pittsburgh district, will be decommissioned by the United States Steel Corp. if it is successful in buying the government-owned steel facilities in Utah, including the Geneva steel plant, Irving S. Olds, chairman of the corporation, told a press conference in Chicago held after a regular meeting of directors in that city last week. In connection with the meeting the directors inspected properties of the corporation in the area.

Mr. Olds said the guiding principle of the corporation in its postwar building will be to follow the market. As the market for steel shifts, the corporation will shift facilities. As new facilities are needed, they will be located near the market. Older facilities, whose location was determined by conditions years ago, will be abandoned, he said, adding that in such shifts the trend obviously will be toward the west.

Both Chairman Olds and President Benjamin F. Fairless discussed the prospects for civilian steel this year at the press conference. Both made it clear the matter is entirely in the hands of the government.

Mr. Fairless said: "We do not presume to tell how much steel will be available for civilian use. Under present conditions, we are producing all the steel we can and the government tells us to whom we may sell it.

Efforts Confined to War Materials

"All output," he continued, "is going to one customer, Uncle Sam. If WPB decides that any part of this output can be diverted to civilian manufacture, the corporation will be glad to oblige. Until then, all efforts will continue to be confined to war materials."

Mr. Olds emphasized it is reasonable to infer that WPB believes that steel will be available for the auto program and other reconversion authorizations made recently. Otherwise, he said, it is doubtful that the programs for civilian auto production would have been authorized.

Mr. Fairless was not optimistic that production of steel can be increased. WPB Chairman Krug stated recently that new civilian demand might stimulate production. U. S. Steel, said Mr. Fairless, is producing its maximum under present manpower limitations and condition of equipment.

Directors of the corporation inspected properties in the district in connection with their regular meeting. On June 5 they toured the Collins street works of American Steel & Wire Co., Joliet, Ill., which ranks as the largest of its kind in the world. It includes three rod mills, wire drawing, galvanizing, fencing and other facilities, with the last of the new installations put into production early this year.

Following the board meeting on June 26, the party inspected the South Chicago and Gary plants of Carnegie-Illinois Steel Corp.

Chairman Olds recently disclosed some of the corporation's postwar plans for subsidiary companies operating in the Chicago district. Improvements and expansion in Gary facilities alone will cost at least $50 million, including work at Carnegie-Illinois Steel Corp., American Bridge Co. and National Tube Co. plants.

Two weeks ago, Carnegie-Illinois announced that as soon as possible it will launch some of the corporation's postwar work in reconstruction of three blast furnaces at South Chicago and Gary to make them the largest in the country. Company also announced in the same program increasing of cold-reduced tin plate capacity at Gary, as well as replacement of ore and coke pockets at the South Chicago blast furnaces. The Gary and South Chicago steel works already rank as world's largest and second largest, respectively.

In addition to Messrs. Olds and Fairless, directors attending the meeting included Enders M. Voorhees, chairman of the finance committee; Sewell Avery; James B. Black; Cason J. Callaway; Philip Clarke; William A. Irwin; Alexander C. Nagle; and George A. Sloan.

Also in Chicago to join in the inspection trips were L. A. Paddock, president, American Bridge Co., Pittsburgh; Clifford F. Hood, president, American Steel & Wire Co., Cleveland; J. L. Perry, president, Carnegie-Illinois Steel Corp., Pittsburgh; and Charles R. Cox, president, National Tube Co., Pittsburgh.

Merger of Wickwire Spencer Steel Co. and Colorado Fuel & Iron Corp. Is Proposed

MERGER of the Wickwire Spencer Steel Co., New York, with the Colorado Fuel & Iron Corp., Denver, was proposed last week. At a meeting of the Wickwire board a merger offer from the Colorado Fuel & Iron board was presented.

The proposal calls for merging Wickwire into Colorado Fuel & Iron, the latter to be recapitalized by splitting present outstanding common stock, and issuance of two shares for each share now outstanding. Authorized common stock will be increased accordingly. Also outstanding warrants for common stock of Colorado Fuel & Iron would be adjusted in accordance with the warrant agreement, and Colorado Fuel & Iron would create an issue of preferred stock ($20 per 5 per cent cumulative convertible preferred) bearing dividends of $1 per year, payable quarterly, such dividends to be cumulative. This stock would be convertible at the option of the holder into one share of the new common stock of Colorado Fuel & Iron.

Also, each share of Wickwire Spencer Steel common would be exchanged for 1 1/10 shares of the convertible preferred stock of Colorado Fuel & Iron, and Colorado Fuel & Iron would consent to payment by Wickwire of a dividend of $1 per share prior to the merger, in the meantime Colorado reserving the right to continue to pay quarterly dividends of 25 cents per share.

To permit further consideration the Wickwire board meeting was adjourned to June 29.

Wickwire Spencer operates blast furnaces, open hearths, rolling mills and fabricating plants. It manufactures a wide variety of wire and wire products including wire rope and cable. It owns four plants located at Worcester, Palmer, and Clinton, Mass., and Buffalo. The plant at Buffalo is equipped with two blast furnaces with capacity of 320,000 tons of pig iron, four open-hearth furnaces with a capacity of 150,000 tons of ingots.

Colorado Fuel & Iron Corp. has an annual ingot capacity of approximately one million tons. Largest part of its output is in the form of products for the railroads, but it also produces shapes, plates and bars. Main plant of the company is at Pueblo, Colo., where it operates blast furnaces with an annual capacity of 563,000 gross tons of pig iron, and 16 open-hearth furnaces with annual steel ingot capacity of approximately 880,000 gross tons. At Oakland, Calif., it has a plant for the manufacture of wire products and at South San Francisco, it has a wire mill. The company owns coal mines, iron ore and other properties.

Small Business Assured Aid in Reconverting

WPB Chairman Krug summarizes steps taken to assist small plants. Program aimed to prevent scramble for supplies

AIDS to small businesses in reconverting to civilian production, within the framework of continuing governmental controls, were summarized recently by J. A. Krug, chairman, War Production Board.

The whole pattern of WPB's program of modification of controls since V-E Day, he said, has been designed to permit maximum expansion of civilian production while preventing a wild scramble for limited supplies.

Mr. Krug summed up the steps WPB has taken to assist small business as follows:

1. Issuance of Priorities Regulation 27 to give blanket priorities assistance until Dec. 31 to smaller manufacturers (those producing less than $50,000 per quarter), which will give them preference in obtaining production material over larger plants reconverting to general civilian production.

2. Small-order exemptions in allocation controls, which allow small businesses to place orders for many scarce materials below certain maximum quantities without applying to WPB for authorization.

3. Exemption of small plants from certain restrictions in the authorization of increased production. The most important of these is the exemption of plants employing 100 or fewer persons from the requirement of a manpower check in tight labor areas prior to authorization of expanded civilian production.

4. Limitation of manufacturers' stocks to a practicable minimum working inventory to prevent hoarding and encourage fair and even distribution of materials in short supply.

5. Retention of two limitation orders controlling inventories of large wholesalers and retailers which do not apply to small distributors.

6. Provision for manufacturers producing over $50,000 per quarter to obtain priorities assistance of bottleneck items.

7. Maintenance of a careful watch over compliance with WPB orders, thus preventing dislocation of supply for the honest majority of manufacturers by an unfair few. In addition, spot checks on big users of metal are being started and will be intensified now that steel is available without CMP tickets.

8. An investigation of concerns involved in large contract cancellations or cutbacks to see that orders for materials ordered on such contracts are properly and promptly canceled.

9. Maintenance of ceilings over the total volume of activities in nine major production industries and in construction, which will prevent these industries from draining all the supplies in the free market at the expense of other production.

Under PR-27, manufacturers who produce less than $50,000 worth of their own products per quarter receive a preference rating of AA-4 and assistance in obtaining needed controlled materials (Z-3 allotment symbol). About 19 per cent of the total number of wage earners employed in all manufacturing establishments are represented in the $50,000 per quarter figure.

Munitions Employment Declines by 600,000

Employment in munitions industries declined 600,000, from 9,000,000 to 8,400,000 in the 2½-month period from March 15 to June 1, according to Paul V. McNutt, chairman of the War Manpower Commission.

During the same period, cutbacks and expirations of munitions contracts caused 29 labor areas to be reclassified downward. Of a total of 300 labor areas, only 29 now have a shortage, 182 have a balance, 77 have a surplus and 12 are depressed.

In forecasting coming developments on the manpower front, WMC predicts that by June, 1946, unemployment will climb to 1,800,000, although considerably higher levels of unemployment may occur for brief periods. Despite the layoffs due to cutbacks since the defeat of Germany became apparent, unemployment at present is at a low level. "The number of unemployed stood at 730,000 in May, some 40,000 below the previous month and 100,000 under the March level," says WMC. Many workers displaced by munitions cutbacks are finding jobs in activities that have been starved for manpower during the war, such as agriculture, trade, service industries and finance.

WMC warned that while the release of manpower from declining war production will result in an increase in unemployment before the end of the year, an acute labor shortage will continue in many critical areas and industries. By next December, it is expected that 1,300,000 will be unemployed, with possibly as many as 2,000,000 temporarily out of work at given stages of the cutback program.

Shipbuilding, aircraft and ordnance industries were those most seriously affected by cutbacks and contract run-outs to date. Shipyards released 185,000 workers in the 2½-month period, aircraft plants let out 230,000 and ordnance factories laid off 110,000.

TRANSITION TOPICS

AXIS INDUSTRY— Break-up, transfer and rigid control of Germany's heavy industry favored by American policymakers to eliminate German war potential. See page 57.

LABOR— Widespread strikes are accompanying reconversion to civilian goods production. Critical war output affected. Many stoppages are for jurisdictional and trivial causes, but generally reflect labor's unwillingness to relinquish advantages gained during emergency. See page 60.

POSTWAR PLANNING— United States Steel Corp. plans to decommission certain facilities, chiefly in Pittsburgh district, if it is successful in buying government-owned facilities in Utah. Guiding principle in corporation's postwar planning will be to follow the market. See page 64.

SMALL BUSINESS— WPB chairman summarizes aid offered to small firms in reconverting to peacetime status. Senate groups revive debate on "Big vs. Little Business." See pages 65, 66.

SURPLUS TOOLS— Government should retain minimum of 50 per cent of machines it now owns as insurance against future needs and to protect industry, manufacturer recommends. See page 79.

PLASTER MOLD CASTING— Use of plaster for molding small castings, although employed commercially in small way for over 30 years, has bounded forward with recent development of a method of quick drying the material. High dimensional accuracy and reproduction of fine details in nonferrous castings are points of attraction for postwar producers. See page 96.

"Big vs. Little Business" Debate Revived in Government Studies

Reports by Smaller War Plants Corp. and by Senate small business subcommittee on foreign trade recommend special aid for medium-size and small concerns in postwar period. Suggests greater participation in export trade

REMINISCENT of the "big vs. little business" debate which filled so many volumes of testimony during the hearings of the old Temporary National Economic Committee are reports just issued by two groups which will have considerable influence over postwar government policies toward private business.

One is Sen. Claude Pepper's Foreign Trade Subcommittee, Senate Small Business Committee. The other is the Smaller War Plants Corp., of which Maury Maverick is chairman and general manager. Both reports agree that unless considerable help is given to small business, its survival is threatened.

The Pepper report, though it sets out to discuss legislation needed to safeguard and promote our interest in foreign trade, reflects deep concern over the alleged extent to which small business suffers from big business competition.

The Maverick report differs from the Pepper report principally in being more definite in assigning the blame for the troubles that plague, or threaten to plague, small business, and in recommending the formulation of government policies aimed at curing these troubles. In general, the Maverick formula calls for alleviation of the difficulties of small business by giving more power to the Smaller War Plants Corp.

One part of the Pepper report states the "big vs. little business" issue as follows:

"In manufacturing industries, the great handicap of the small firm frequently lies in its advertising, sales and other marketing techniques, rather than in any superiority which large-scale firms may enjoy in labor productivity. A manufacturer with a large volume of trade sufficient to warrant the use of national advertising, the development of a nationwide sales force, the establishment of its own retail outlets, and other methods for promoting his individual brand or product, has enormous advantage over the small manufacturer who cannot make a continuous and forceful impression on the buyer, and who must distribute his product through wholesalers and retailers who also handle the lines of his competitors.

"The disadvantage of the small business firm in this field is not a truly competitive disadvantage. It derives from a situation of imperfect competition, being rooted not in price or quality, but in the quasi-monopolistic private advantage enjoyed by the owner of nationally advertised brand names."

The report discusses at some length the earnings of small business to show that small business is at a disadvantage. From charts prepared by the Department of Commerce, from data of the Bureau of Internal Revenue, it deduces the small corporations have been able to earn average profit rates comparable to those of the larger corporate firms only when the overall volume of national production was high; the smallest firms bear the brunt of depression in the form of the largest rates of loss on investment. At the bottom of the depression in 1932 only the largest corporations—those having assets above $50 million—were in the aggregate able to hold on to a slender margin of profit; but the losses in the smaller size classes extended in unbroken procession sharply downward."

This lack of adequate financial reserves, the report says, is only one reason why, in seeking to do export business, the small business firm "finds it difficult if not impossible, to anticipate or hedge against drastic price and foreign currency fluctuations; this is in contrast with larger exporters who maintain their own banking subsidiaries and conduct their own foreign exchange businesses. If small business is to compete with large-scale business in foreign trade, the uncertainties of foreign exchange movements must be reduced; small business needs stability in foreign exchange."

The report cites estimates that full production and full employment in the United States in the postwar period will translate into a gross national income of $170 billion a year; on such a basis our exports should be on the order of $10 billion or one-seventeenth of the national product. Such an export program, it says, could mean steady jobs for more than 5 million people in the direct export industries. Export trade represents a big potential for small business, which thus is vitally interested in having its opportunities in this field amplified by extending the Reciprocal Trade Agreements Act, says the report. The report further advocates ratification of the Bretton Woods proposals.

Mr. Maverick's report devotes much space to the concept that full employment after the war can be achieved only through a great expansion in small business, and that this objective can be brought about partly by curbing big business. There has been a great con-

HONOR STETTINIUS: Mexican delegates to the United Nations conference in San Francisco present retiring Secretary of State Edward R. Stettinius with a set of silver plates during a dinner held in his honor. Left to right are: V. K. Wellington Koo, Chinese ambassador to England; M. Tomas Morlet, Mexican secretary general; Mr. Stettinius; Manuel C. Gallagher, Peruvian minister of foreign affairs; Ezequiel Padilla, chairman of the Mexican delegation to the conference. NEA photo

centration of industry during the war; 100 large corporations received 73 per cent of the value of all prime contracts awarded by the Army and Navy between June, 1940, and September, 1944. says the Maverick report:

"Full production and full employment is impossible after the war if economic power is concentrated in the bigs. When the bigs get too big, when they get too much, they fix prices, restrict production. Unemployment then comes in millions. Finally the bottom drops out, and catastrophe, one way or the other, comes to the society which has fallen in confusion. If we want the American system, we must undo this situation. Or else we lose the free enterprise system and drop through our own trapdoor of ignorance and complacency into a form of totalitarianism."

Reports on 250 Corporations

Mr. Maverick reported on a recent SWPC study of the affairs of 250 largest manufacturing corporations.

"These 250 corporate giants," the report says, "own 60 per cent of the nation's corporate-owned manufacturing productive assets. About 75,000 other corporations own the balance of 40 per cent. So the 250 biggest owned 50 per cent more than all other manufacturers combined. The question is, 'who dominates American industry?' We are not inclined to think the tail wags the dog.

"This 250 also did 60 per cent of the private financing of war facilities.

"The big corporations did a great war job. They got, were given, or had thrust upon them, the bulk of prime war contracts. Of the prime war contracts active on Sept. 30, 1944, they held almost 80 per cent.

"Some of these orders they subcontracted to others. But the war production job was too big for the nation's plant, so when it came to the government building new plants, the 250 got to operate about 80 per cent. Since they hold option to buy the plants they operate, the value in these plants is part of the potential strength of the 250 against the rest of the manufacturing community after the war.

"Big business has benefitted during the war in a number of other important ways which cannot be measured or charted—for example, in the scientific and technical research conducted at government expense by the large corporations. Who can measure the peacetime applications and uses of this scientific knowledge? Obviously the companies in whose plants this research work has been carried on will be its chief beneficiaries.

"Innumerable new products and processes developed for war production can be adopted easily to peacetime output. Futhermore, large companies have gained invaluable 'know-how' from producing a vast quantity of munitions items under the pressure of war schedules. This 'know-how' will cut costs and improve the efficiency and competitive advantage of these large companies. Large business ultimately may benefit even more from these intangible gains than from the more readily measurable factors, such as contract awards and plant equipment."

Net capital assets of the 250 largest corporations total $14.5 billion as compared to $9.9 billion for all of the remainder of American corporate industry, states the Maverick report. Actually, corporate evaluations of net capital assets after depreciation understate materially the productive value of equipment and plant; physical assets are generally depreciated faster than normal wear and tear requires. Creation of this "hidden" reserve production capacity has been vastly accelerated during the war because of the liberal 5-year amortization provisions allowed for tax purposes under certificates of necessity. Therefore, a definite, but unknown, part of the depreciation reserves actually represents valuable postwar productive capacity.

"Comparison of capital assets on a gross basis (before depreciation) shows that 250 largest corporations held $29.1 billion with the balance of $19.1 billion held by all other manufacturing corporations. On this basis the 250 giants hold just over 60 per cent of the productive capacity.

"Finally, the cost value of the publicly owned war facilities operated by the 250 largest corporations amounted to $11.1 billion, as compared to $3.2 billion for the remainder of the American manufacturers.

"The War Production Board estimates that approximately 60 per cent of the cost value of the government-owned plants in private hands will be usable immediately or after minor conversion. Most of the usable facilities are held by the large companies, but after allowance for this, the 250 largest corporations still hold some $6.1 billion, as compared with $2.6 billion for all medium-sized and small manufacturers.

Hold 61.9% of Production Facilities

"In short, the gross capital assets plus the usable publicly-owned facilities come to $35.2 billion in the case of the 250 largest manufacturing corporations, as compared to $21.7 billion for all other (about 75,000) manufacturing corporations. On this basis, 61.9 per cent of the productive facilities are held by the 250 largest corporations. Three-fifths of the postwar capacity to produce are held by the 250 largest manufacturing corporations and the remaining two-fifths are spread among the more than 75,000 medium-sized and small corporate manufacturing enterprises.

"This is distortion of the economy which threatens disaster."

There is still the possibility, says the Maverick report, that this impending extreme concentration could be substantially decreased if a vigorous 3-point program were adopted:

1. The Surplus Property Board should cause the publicly-owned usable plants to be distributed largely to medium-sized and small business;

2. A strong antitrust policy should be followed and, in particular, the O'-Mahoney-Kefauver bill should be passed to prevent giant corporations from gobbling up small business;

3. The ability of small business to continue and compete should be strengthened by making available financial assistance at reasonable interest rates, and technical assistance, as proposed elsewhere in this report.

The report again recommends adoption of a business loan insurance plan molded after the National Housing Act, Title I.

Says Foreign Trade Is Vital

Too long has small business been ignored in the field of foreign trade, and left to be squeezed out by the large companies, the report goes on. Foreign trade is vital if we are to have full production and full employment, and "we are on the road to many troubles if we permit foreign trade to be hogged by big business and cartels in the future as in the past." Participation of American small business in postwar foreign trade can be increased, says the report, with the adoption of these programs:

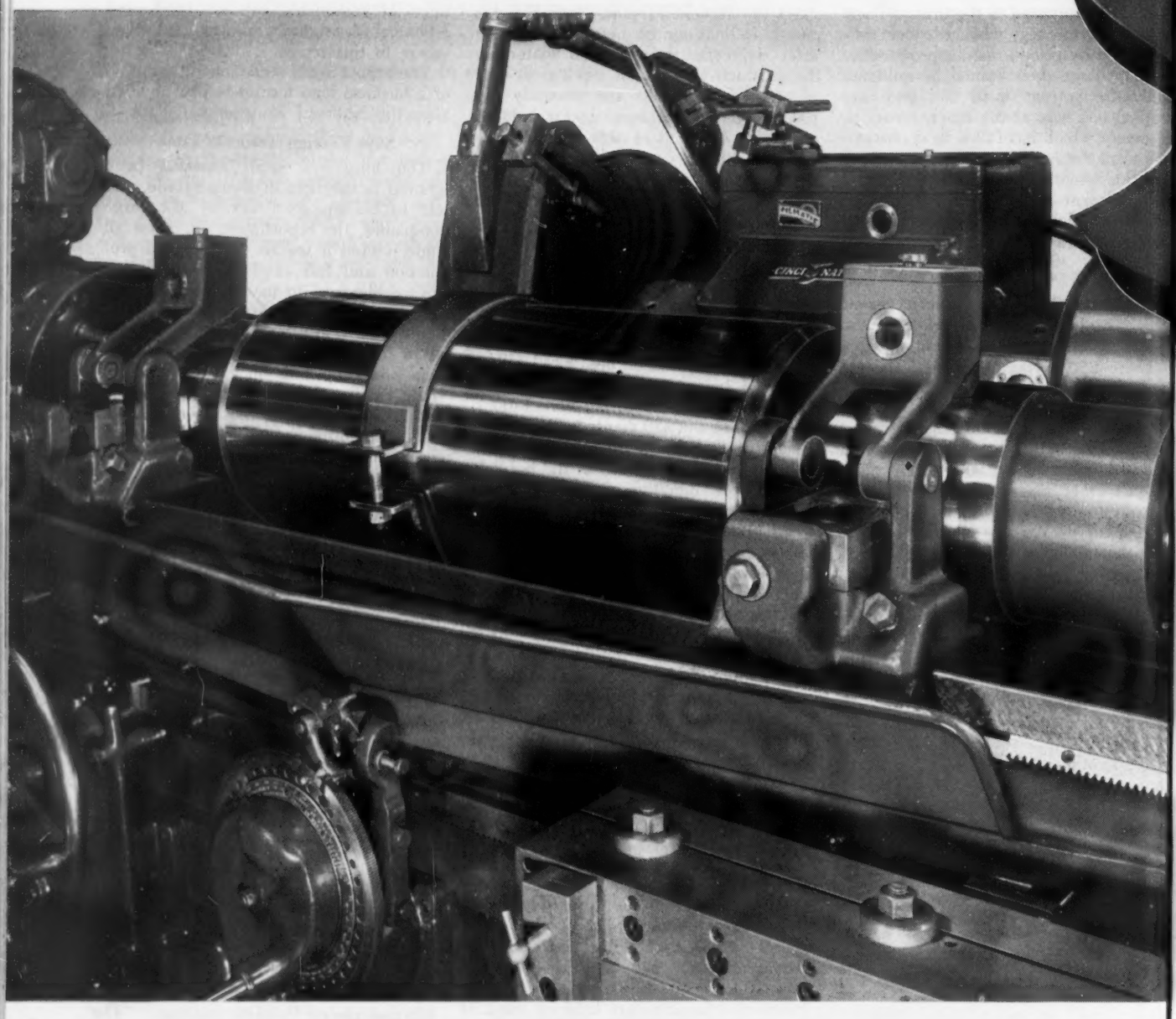
1. Appointment of small business specialists in government offices in principal foreign cities; they would be the overseas "eyes and ears" of our little businessmen, and they report to American small business through the SWPC's 110 field offices throughout the United States.

2. Extension of the SWPC's Technical Advisory Service, "to help small business develop new products for foreign as well as domestic sale," to "help small business organize its production processes," to "make available the scientific 'know-how'; and 'to advise on technical problems peculiar to the foreign trade.'"

3. Establishment, in co-operation with the National Bureau of Standards, of minimum, voluntary standard specifications for goods to be sold abroad. "This would establish for small business the name and reputation, the assurance of quality and reliability which size, wealth and advertising have established for the giants."

4. Continuation of present SWPC relationships with foreign purchasing missions in the United States so that small business may obtain its share of the business placed by these missions. "The SWPC would act as intermediary, obtaining for small business orders which otherwise would flow to big companies; perhaps it should even have the power, to be used with discretion, of accepting contracts from foreign purchasing missions for redistribution among smaller plants."

5. Creation of credit assistance to enable small firms to engage in foreign trade. This would include both government-insured export credits, and direct loans. Our system should incorporate the general principles of the system used by the United Kingdom since 1921, and adopted by Canada last year, with adaptations to meet the problems of small business in the United States.



Close-up of the roll in the machine, showing journal rests and the wheel truing attachment clamped to the center of the roll (truing position). The machine is a CINCINNATI Plain Self-Contained Grinder with Swivel Table Type Roll Crowning Equipment. These machines are available in 14″ and 16″ swing sizes. Catalog G-491-1 contains complete information and specifications.

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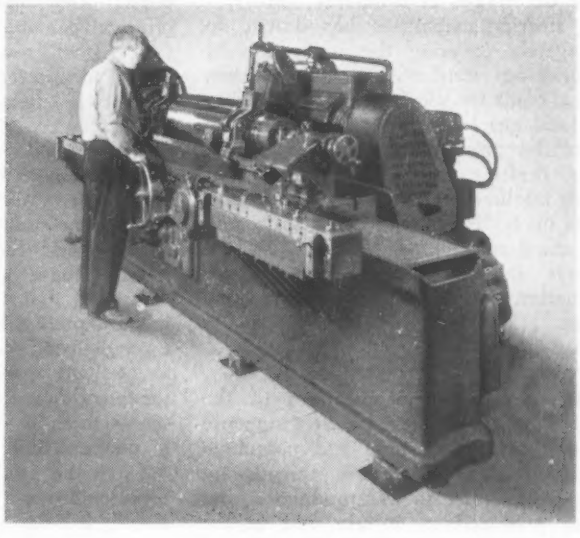

The operator combines his long experience with the inherent accuracy of a CINCINNATI *Plain Self-Contained Roll Grinder to finish crown aluminum foil rolls. Catalog G-491-1 gives complete information. Or look in Sweet's Catalog File for Mechanical Industries for a brief description of this machine.*

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Unification of Anglo-American Standards To Be Discussed

American, British and Canadian representatives will hold meeting in fall to consider unification of engineering standards, screw and pipe threads, limits and fits, drafting practices, and standardization of measuring tools

LONG-STANDING differences in Anglo-American engineering practice and standards of measurements, which have impeded war production, will be discussed at a four-week conference to be held in Canada this fall, the Combined Production and Resources Board announced last week. The United States, Canada and Great Britain are members of the board which operates to co-ordinate production between them.

Historically-based differences in the design of screw threads alone in Britain and the United States have added at least $100 million to the cost of the war, it is estimated. Important advances in co-ordination of practices have been made as the result of earlier conferences and other CPRB-sponsored contacts. This conference in the fall is intended to reduce differences in standards further.

A steering committee has drawn up an agenda covering the unification of engineering standards, screw threads, pipe threads for use in aircraft and other fuel and gas lines, limits and fits which affect the practice of most engineering firms, drafting practices on which depends intelligibility of drawings to engineers on both sides of the Atlantic, and the standardization of accuracy of engineers' measuring tools, such as micrometers, vernier calipers, and dial gages.

Valuable Collaboration Possible

Behind all the technicalities of the subjects to be dealt with are immense possibilities for wartime and peacetime collaboration. The screw thread, for example, is basic to war production, but those produced in Britain and in the United States are sufficiently different in certain important characteristics as to cause tremendous difficulties in the maintenance and interchangeability of equipment, and to render necessary carrying of different stocks and gages in the field. Thus, while the industries of both countries are still heavily engaged in production of weapons for use against the Japanese, this has resulted and still results in serious and unnecessary delays and waste of manpower.

These existing differences cause no embarrassment domestically; but serious difficulties develop when otherwise identical items of equipment have to be manufactured in one territory for use in another, or manufactured in two or three countries simultaneously for common use in the field.

The need for a common standard became apparent during World War I, resulting in the congressional appointment of a Screw Thread Commission to investigate and promulgate standards for screw threads. No definite agreements were reached in conferences with British and French interests. In 1926 a British mission in this country proposed adoption of a basic thread angle of 57½ degrees as a compromise between the British 55 degree and the American 60 degree angles. This compromise was not considered acceptable.

Notable progress was made in discussions held when CPRB invited a British mission and Canadian representatives to visit the United States in 1943 to discuss and resolve problems related to production of threaded parts for materiel. Development of a number of projects was initiated which, if carried forward, will result in big savings in material, manpower and equipment.

There has been a continuous exchange of draft specifications and data. Some of the projects progressed to a stage when complete agreement seemed possible by round table discussion, while progress on the remainder of the items discussed could thereby be greatly facilitated. There were also a number of additional items which were considered in subsequent meetings. It is hoped that through conferences already held and to be held agreement may be reached for the adoption of common standards for screw threads and that the differences in practices will be resolved.

From the United States there will be representatives of the Army, Navy, Air Force, Bureau of Standards, the American Standards Association, and of the automotive, aircraft and other industries; from Canada, representatives of the Canadian government, Canadian Standards Association, National Research Council, and of the automotive and manufacturing industries concerned with the production of screw thread products; from the United Kingdom, representatives of the British government, British Standards Institution, which has the support of engineering industries, and various other industries.

Increase in Tank Trailer Output Approved by WPB

An additional 612 tank trailers for use in liberated Europe have been approved with an AA-1 preference rating by the War Production Board. Representatives of the industry have indicated that the industry would be able to take care of the new program despite the fact manufacturers are behind schedule on the present 1945 tank-trailer program. Of the 630 petroleum tanks authorized for the first half of 1945, only 353 actually had been produced up to May 31. However, members of the industry expect to meet their deadline of July 31. Recent cutbacks in military production have relieved the situation not only in the trailer and trailer-tank plants but also in plants supplying such components as axles, wheels, etc.

Reusable Iron and Steel Product Prices Revised

Maximum prices for reusable iron and steel products suitable for use without further reconditioning have been announced by the Office of Price Administration. The new shipping point ceiling prices, which became effective June 26, are established in revised maximum price regulation 310 as follows:

For structural shapes, plates, bars, rods and flats, shafting, black sheets, and miscellaneous products, $3 per 100 pounds in quantities up to 1999 pounds and $2.50 per 100 pounds in quantities of 2000 pounds and over.

For coated sheets, $3.35 per 100 pounds in quantities up to 1999 pounds, and $2.85 per 100 pounds in quantities of 2000 pounds and over.

For all reusable iron and steel products, except wire rope and wire products, that require reconditioning, a maximum shipping point price of $2.10 per 100 pounds in any quantity is established.

Maximum shipping point prices for wire rope and wire products, except nails, ready for reuse without further reconditioning, are established at 85 per cent of the mill carload delivered price for the same new products at the shipping point nearest location.

For wire rope and wire products that require reconditioning to make them suitable for use, a maximum shipping point price of 55 per cent of the mill carload delivered price of the same new product at the shipping point nearest location is established.

When a buyer asks that holes be drilled or punched in reusable material, the maximum drilling charge that may be made is 10 cents per hole. No extra charge, however, may be made for cutting material to lengths. Any welding, bending or cutting to diameter or pattern is fabrication, and maximum prices for items that have been welded, bent or cut are those already established for fabricated structural steel shapes, plates and bars. Maximum prices for the service of fabrication on iron and steel prod-

ucts not owned by the seller are established under maximum price regulation 531 (industrial services).

Maximum delivered prices for reusable products are fixed at the shipping point price plus the established charge for transporting the product from the shipping point to the point of delivery.

Where out-of-town delivery is made in a vehicle owned or controlled by the shipper, the maximum transportation charges must not exceed the established railroad freight from the railroad siding at or nearest the shipping point to the railroad siding at or nearest the point of delivery, for the quantity shipped.

Where local delivery is made in a vehicle owned or controlled by the shipper, a maximum delivery charge of 10 cents per 100 pounds may be added to the shipping point price. A minimum shipping charge of 50 cents is authorized.

Where shipment is made in a truck owned or controlled by the buyer, the seller may not add any transportation charge to the maximum shipping point price.

Appointments-Resignations

Harold W. Bangert of Fargo, N. Dak., director of the Fargo-Moorhead district office of the Office of Price Administration, has been appointed director of the price control board in OPA's national office, Washington.

* * *

Fred C. Rockwell of Lexington, Va., has been named director, Miscellaneous Minerals Division, WPB, succeeding James S. MacGregor, resigned.

* * *

John B. Campbell, deputy vice chairman for production, WPB, is leaving shortly on a mission to Europe for the board and will be succeeded by Robert M. Hatfield, present special assistant to the vice chairman for operations.

* * *

John C. Parsons of Hartford, Conn., has been appointed an assistant general counsel, WPB.

* * *

Orval A. Slater has been designated to succeed N. G. Burleigh, who has resigned as director of Service Equipment Division, War Production Board.

* * *

Robinson Newcomb has been appointed director, Division of Research and Statistics, Bureau of Community Facilities, Federal Works Agency, and economist to the administrator, Maj. Gen. Philip B. Fleming. He was previously director, Division of Construction Research, War Production Board.

* * *

Fred W. Ramsey, formerly chief deputy director, WPB region 5, has been named director of the region. He succeeds John C. Virden who has been appointed to an executive position with the Army-Navy Liquidation Commission in Washington.

PRIORITIES–ALLOCATIONS–PRICES

Summaries of revocations of and amendments to orders and regulations; official interpretations and directives, issued by War Production Board and Office of Price Administration

REVOCATIONS

BED SPRINGS: Order L-49 which controlled the manufacture of bed springs, box springs, innerspring mattresses, studio couches and other types of sleeping equipment. WPB will allot in the third quarter ,however ,as much steel, copper and aluminum to bedding manufacturers as was allotted when order L-49 was in effect. In addition, manufacturers may use materials in excess of their allotments to the extent that they are available without priorities assistance. WPB approval is not required for such additional production. (L-49)

GOLD: Resumption of gold mining is now permitted, after July 1, through revocation of order L-208 which had been issued to conserve machinery and supplies for the more vitally needed lead, zinc and copper. (L-208)

CALCIUM CARBIDE: Order M-190 which established allocation control over calcium carbide, used for the production of chemicals and for cutting and welding. Allocation control over this material has been transferred to order M-300. (M-190, M-300)

AMENDMENTS

MACHINE TOOLS: Only items with a producer's list price of $1000 or more may be scheduled now under order E-1-b. The producer's list price means the sale price at which the producer's catalog or other price publication lists the basic tool, exclusive of motor, motor drive or any attachments thereto, unless these parts are initially built into the basic tool and are an integral part of the tool. Where the producer's list price for the basic tool is $1000 or more, the term can include all fixtures, equipment and tooling (including motors, if part of the basic tool) covered by the original purchase order and required to make the basic tool usable in the production intended. It does not include replacements, spare parts or equipment, or extra tooling. (E-1-b)

INSTRUCTIONS

WAREHOUSES: Direction 6 to CMP Regulation 4, which placed certain limitations on the quantity of controlled materials that a warehouse or distributor could deliver on authorized controlled material orders identified by the CMP allotment symbol "Z" (deferred orders), has been revoked.

REPAIR MATERIALS: Repairmen using the ratings assigned by CMP regulation 9-A or a service organization operating under P-126 may employ the ratings to get motors repaired, rewound or rebuilt if they are used in such household products as refrigerators, washers, oil burners, coal stokers, etc., or in commercial refrigerating systems. This is provided in direction 5 to CMP Regulation 9-A.

WAR CONTRACT CANCELLATIONS: An amendment to WPB Directive 40 has been issued to provide for cancellation of war contracts as rapidly as possible after victory over Japan. The amended section of the directive states: War contracts will be cancelled as rapidly as is mechanically possible after the declaration of V-J Day; procedures for clearance and consultation on cutbacks will cease to be be effective at V-J Day, procurement agencies will report, by program, to the Production Readjustment Committee those programs which are expected to continue after V-J Day. The reports called for in the above shall be submitted under the terms and limitations of the directive of the Office of War Mobilization and Reconversion dated Jan. 20, 1945, entitled "Report of Changes in Production and Material Requirements to the War Production Board."

PRIORITIES REGULATION

APPEALS: Requirements of priorities regulation 16 (appeals procedure) for manpower information on form WPB-3820 have been relaxed by eliminating the necessity for filing this form with an appeal in any case where production will take place outside group 1 and group 2 labor areas or in establishments where the total number of production workers will be 100 or less. (PR 16)

MRO SUPPLIES: Maintenance, repair and operating supplies obtained under direction 25 (MRO for conversion to new products) to CMP regulation 5 or obtained without priorities assistance are included in items exempted from the inventory limitations of priorities regulation 1. Inventory restrictions of PR-1 do not prohibit delivery or acceptance of such MRO items. Nothing in the amended direction 6, however, permits receipt of MRO supplies in excess of applicable MRO quotas. (PR-1)

PRICE REGULATIONS

REFRACTORIES: An increase to 6 per cent, from the 3 per cent previously granted, over the March, 1942, ceiling prices for fire clay and silica refractory brick produced east of the Mississippi river and in Missouri has been authorized by the Office of Price Administration. (No. 188)

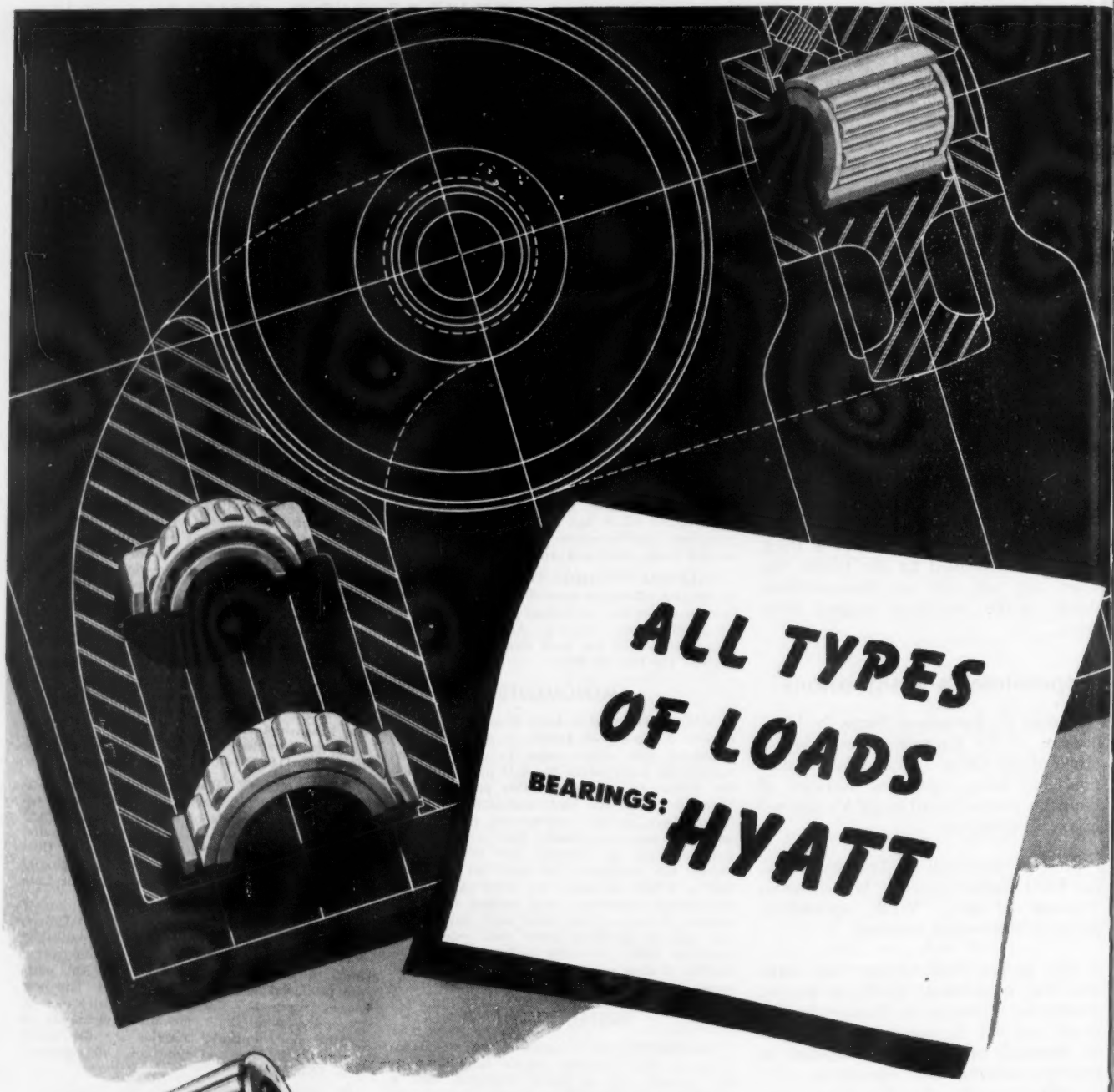
AUTOMOTIVE PARTS: Automotive parts manufacturers will have until Aug. 1 to reexamine their records of nonlist prices charged or quoted in the six-month period ended March 31, 1942, to determine whether they are ceiling prices. The deadline was originally set for June 2 and later was extended to June 18. (No. 452)

MATTRESS INNERSPRING UNITS: Dollar-and-cent ceiling prices have been established for manufacturers' sales of mattress innerspring units, in advance of the time when the units are produced again on a large scale. The new prices represent March, 1942, price levels, generally, with slight upward adjustments to permit more uniform margins for the many variations in size and types of coil construction. (No. 548)

Manufacturers of Stampings Granted Priorities Aid

Manufacturers of stampings required for the 265,000 domestic mechanical refrigerators, 350,000 washing machines and 35,000 electric ranges scheduled for production in the third quarter of 1945 will have priorities assistance in obtaining materials, War Production Board officials said recently.

Assignment of authorizations for third-quarter production of 492,627 electric irons to 33 manufacturers has been announced. Within the limits of the approved 1945 program for 526,500 electric irons per quarter, WPB authorizes electric iron production only where it will not require materials, components, facilities, or labor needed for more critical production. Authorizations for electric iron production in the first quarter totaled 521,385 and in the second quarter, 522,144.



Representative of how Hyatt Roller Bearings meet specific application requirements is the plate caster assembly in which there are three types of Hyatts, each doing its allotted job.

Minimizing friction and assuring freedom from wear, is a sturdy Hyatt Junior Series Solid Roller Type Bearing in the wheel hub. Contributing to free turning of the gooseneck and applied at its top, is a Hyatt Spherangular Bearing, self-aligning and suitably designed to carry both radial and thrust loads. At the bottom of the gooseneck is a Hyatt Hy-Load Bearing which provides line contact for better load distribution.

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By A. H. ALLEN *Detroit Editor, STEEL*

MIRRORS of MOTORDOM

Big Bill Knudsen doffs three-star army uniform and "retires" to Detroit after five years in organizing and promoting war effort. Huge welcome home celebration staged by motor capital. His future plans are unannounced

DETROIT

BIG BILL KNUDSEN "came home" the other day and in his honor Detroit staged one of its typically ornate celebrations—typical perhaps more of prewar Detroit than the wartime city. At any rate, the affair will live long in the memory of both the guest of honor and of those who attended, so it may be worth reporting in some detail inasmuch as Knudsen more than any other single individual exemplifies the top-rank automotive manufacturing executive, steeped in the tradition and foibles of his trade from the early bicycle days.

The occasion of course was the retirement of Lt. Gen. W. S. Knudsen, Army serial No. 09066, as director of production for the War Department, and the conclusion of five years in the service of his country, first as member of the advisory commission to the Council on National Defense and later co-director of the Office of Production Management. As he modestly expresses it, his job was to "sell war production" to the nation's manufacturers, but more properly he must be given credit for laying the extensive groundwork for the nation's war production, and then following it up by personal visitation to all principal production centers, as well as battle theaters, which took him over a course measuring some 176,000 miles.

Will Take Indefinite Rest

He now lays away his three-star uniform, his distinguished service medal with oak leaf cluster and the other mementoes accumulated in the past five years to sit, as he says, in an easy chair and rest a while at his Grosse Isle home. But you can be sure no one with his boundless energy, despite 66 years of age, is going to sit long, and whether he accepts a consulting executive job with his former employer, General Motors, or strikes out in some new venture, such as heading production operations of a new enterprise of the Fisher brothers, are queries which should be answered soon.

Getting back to Knudsen Day, the event was in the capable hands of Allen B. Crow, executive secretary of the Economic Club of Detroit, aided by a citizens' committee of 150 including all civic, industrial and labor leaders of the community, even down to one A. Pantazopoulos. A medium-sized parade, with three bands, was organized to escort the Knudsen party from City Hall to Masonic Temple at 7 p. m., where all reservations for 5000 seats had been snapped up days in advance. Lending a considerable degree of prestige to the occasion were a number of distinguished visitors, including General of the Army George C. Marshall, Under Secretary of War Robert P. Patterson, Sen. Homer Ferguson, Gov. Harry F. Kelly and Mayor E. J. Jeffries Jr.

The evening's program was done with a flourish, speeches by visiting dignitaries being interspersed with band music and songs by a mixed chorus. General Marshall, a last-minute surprise addition to the program, was an impressive figure as he made a short, crisp and thoughtful speech. It was the first time he had visited Detroit in 20 years and he paid high tribute to General Knudsen as the man who brought "big business methods to the biggest military production effort the world has ever known." He reviewed some of the troublous times experienced when Knudsen first stepped into the production picture. The Russians, for example, were urgently asking for 50,000 pieces of a certain type of ordnance, and the U. S. Army's entire stock at that time numbered only 200. Manufacturers were being deluged with orders for materiel thay had never even seen before, let alone build.

The Army itself was having a bad case of jitters in those days, and here again the calm Knudsen logic helped. The military was imagining the country attacked on all its borders by enemy forces, and was insisting all major production operations be moved to the interior. Even the automotive industry was written off as a key source because so many of its plants were close to the Canadian border. General Knudsen finally knocked down this bogeyman, but it took a lot of punching. In one sense, Big Bill had as much of a selling job on the Army as on the manufacturers, and the fact he now has

HEADS GRAHAM-PAIGE RESEARCH: William B. Stout, head of the Stout Research Division of Consolidated Vultee Aircraft Corp., has been loaned by Convair to Graham-Paige Motors Corp., Detroit, to take charge of Graham's postwar automotive development program. Mr. Stout is shown at left with Joseph Frazer, chairman of Graham-Paige

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so many staunch supporters in the War Department and in Army circles proves his sales tactics brought no deep resentment.

Judge Patterson of the War Department likewise paid high tribute to Detroit's Knudsen. Commenting on his period of Army service, the judge said General Knudsen was the Army's chief trouble-shooter on every production project of the War Department, and visited 1200 plants in two years—an all-time record. As Mr. Patterson said, "There were no sight-seeing visits. He went in quietly, left quietly. He talked to the men operating the machines. He suggested changes in plant layouts. His suggestions were followed, not because they were orders but because those in charge knew that General Knudsen had the production know-how; the Army owes him a great debt. The industrial methods he taught and practiced in the Army will stay with the officers who served under him for years to come . . . in our hour of need we found a great producer, a great war leader."

Actually, it was not quite as simple as this, for wherever General Knudsen visited he was accompanied by a considerable entourage of "brass" along with photographers to record the event.

Climax of the evening was the appearance of the guest of honor who had been watching the program quietly from a box at one side. Visibly touched as he beamed at the great audience, he spoke simply and from the heart. He has never been an accomplished speaker, but appears far more at ease before an audience than he did five years ago when he left Detroit. Characteristically, he said his first thoughts on the many tributes being paid him were that they were "too much." He added, "If I were that good, I could not even live with my family."

Behind General Knudsen's plea for working people to show more diligence and hard work as a means to a better world could be sensed a fervent wish that some common sense and sanity might arise from the mess of union conflicts that is engulfing Detroit today. There is of course little the general can do about it now; in fact, many short-sighted individuals blame him for today's troubles on the grounds he should have taken a firmer hand with union labor back in sitdown strikes of 1937 when he headed General Motors.

One thing is certain. The Knudsen legend is not ended with the conclusio of the present chapter. There will be mor stories of his homely philosophy, hi "direct approach" to problems, his di missal of frippery and froth, his quic deflation of expanded egos. Like th time when he visited one of the GM Dayton plants when it first came into th corporation fold and was shown a ne type of washing machine which a youn research engineer had literally sweate blood over day and night for month o month before getting it to work. Knud sen bent over the device, slowly shoo his head, looked up at the designer wh was rubbing his hands in expectancy an said, "No it's too eggspensive."

Chrysler Corp. has received a new con tract for 7,500,000 of the M-74 "firefly incendiary bomb which will go into mas production at its Evansville, Ind., plan at a rate of 2,000,000 per month. Th bomb is a refinement of the original M-6 gasoline jelly and magnesium incendiar used extensively by B-29s over Japan. I is 24 inches long, 3 inches in diameter with a hexagonal case fitted with a regu lation bomb fin which springs out int position when the bomb is released fro a cluster.

Weight of each individual incendiar is about 10 pounds, and 38 of them ar combined into a cluster weighing 50 pounds, 37 of which can be carried by single B-29. Incendiary content of eac unit is in two sections, one a mixture o petroleum jelly and magnesium and th other phosphorus. After release, th clusters can be set to break open at an altitude by means of a time fuse, an each of the 38 units is detonated by delayed fuse five seconds after impact

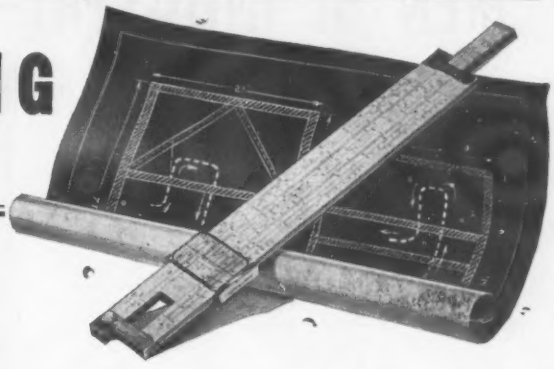
William B. Stout, head of the Stou Research Division of Consolidated Vul tee Aircraft Corp., which was recentl transferred from Dearborn, Mich., t Memphis, Tenn., has been "loaned" t Graham-Paige Motors Corp., Detroit to take charge of Graham's postwar auto motive development program. Consid erable mystery surrounds the move, a Mr. Stout is under long-term contrac to Convair and had initiated researc studies into many projects such as road able airplanes, flying automobiles, etc Why he should transfer his activities t an ostensible competitor is for the mo ment unexplained.

Meanwhile, the Aviation Corp., whic owns a substantial interest in Convai has announced acquisition of assets o the Crosley Corp., Cincinnati, with th exception of Crosley's small automobil division. Sale involved $22 million an included such Crosley properties as re frigerator and radio manufacture, radi station WLW, experimental televisio broadcast stations, household applianc manufacture, etc.

Powel Crosley Jr. has indicated h will organize a new company to buil small automobiles, a project which wa started shortly before the war. The ca has been completely redesigned by group of Detroit stylists.

DIRECTS PACKARD BUYING: R. R. Rees, left, manager of the Packard Motor Car Co.'s Toledo, O., division since its acquisition two years ago, has been appointed director of purchases for all Packard plants, with headquarters in Detroit. He has been affiliated with Packard for 30 years, starting as a construction engineer. He was plant engineer from 1919 to 1943. At the start of this service he directed clearance of car assembly lines for production of the Liberty aircraft engine of World War I. W. H. McCoy, right, general master mechanic of the aircraft engine division at Detroit, succeeds Mr. Rees as factory manager of the Toledo division

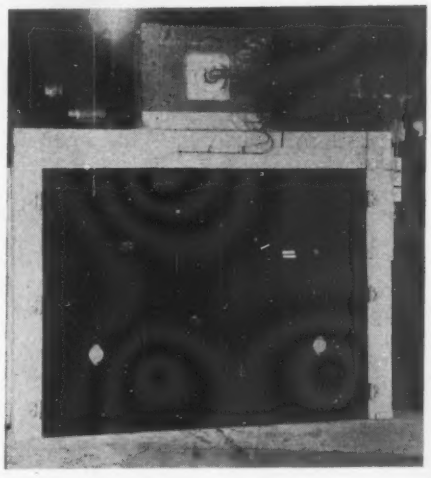
OVEN ENGINEERING NEWS



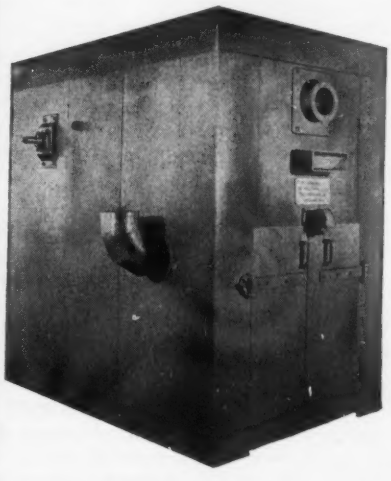
Standard Box Ovens Provide High Speed, Top Efficiency For Simpler Heating Jobs

For simpler heating applications which do not require elaborate handling, conveying or heating equipment, box-type ovens such as those shown here can often be used to advantage. The Industrial Oven Engineering Company designs and manufactures a complete line of such ovens, in addition to its specially engineered oven-conveyer and oven-processing systems.

Each box oven is, of course, custom built, assuring maximum efficiency for each user's needs, but standardized designs mean higher construction speed.

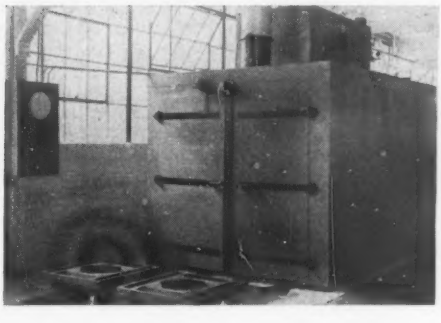


Above: Batch-type, two-truck oven for baking armatures and stator coils. This oven's total load is 6000 pounds, carried on two trucks weighing 1000 pounds each. With this load on the basis of a short cycle bake, fuel costs average only 28 cents per hour.



This 900° oven for heat treating aluminum forgings has a built-in, high-pressure air heater for positive and rapid circulation through a relatively dense work load, and is shipped assembled.

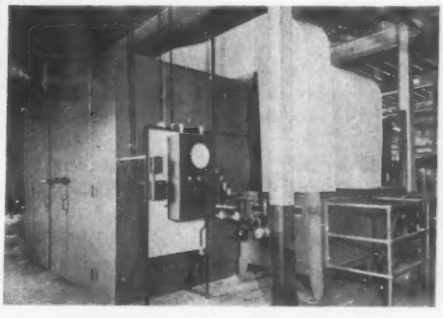
Below: A standard type of dehydrogenizing oven, made for various widths and gages of cold rolled steel strip in coils. This unit replaced less efficient equipment which handled a given load in 18 hours at 900°, and reduced the dehydrogenizing time to 9 hours at the same temperature.



Baking Time Cut; Finish Improved

The oven shown in this column, designed for baking synthetic finishes on steel storage cabinets, is now used for finishing ordnance items. Tests conducted on regular production runs show a 15 percent reduction in baking time, with a decided increase in surface luster.

Like every other **IOE** installation, this oven is equipped with a large volume convection air heater and complete temperature, safety and ignition controls.



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6. Fool-proof control equipment.

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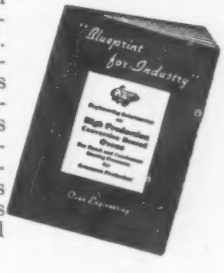
Get your copy of "Blueprint for Industry — Part II". This interesting 18-page book contains detailed information and blueprints on a variety of high-production convection heated ovens for industry, as well as other useful engineering data.



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MEN of INDUSTRY

C. B. McLAUGHLIN

M. F. BEECHER

W. R. MANSKE

Carl B. McLaughlin has been named head of the recently established Engineering Service Division, Tube Turns Inc., Louisville, Ky. Mr. McLaughlin formerly was with the organization's Pittsburgh office.

—o—

Harry R. Likens has been appointed plant industrial engineer, South Chicago Works of the Carnegie-Illinois Steel Corp., Pittsburgh, succeeding **H. H. Rothrock** who resigned to accept a position with the Pittsburgh public schools system. Mr. Likens first joined the Carnegie-Illinois company in Pittsburgh five years ago. In 1943, he was transferred to the company's Chicago offices as assistant to district industrial engineer and served in that capacity until his present promotion.

—o—

Charles P. Whitehead, vice president, General Steel Castings Corp., Eddystone, Pa., has been elected president of the company, succeeding **Harrison Hoblitzelle** who has been elected chairman of the board. **G. Fred Driemeyer,** has been elected vice president in charge of sales; **George L. Alston** was elected vice president and continues as secretary and treasurer; **William M. Sheehan,** formerly assistant vice president is vice president.

—o—

Norman F. Melville, deputy chief, wire and cold drawn bar branch, Steel Division, War Production Board, Washington, has returned to the Pittsburgh Steel Co., Pittsburgh, in his former capacity as manager of sales, steel and wire products.

—o—

G. S. Eastburn has resigned as general sales manager, Central Iron & Steel Co., Harrisburg, Pa., and **I. M. Smith** has been appointed acting general sales manager.

—o—

Malcolm Fleming, vice president and director, Hickman, Williams & Co., Chicago, in charge of operations of the company in the Cincinnati, O., territory for the past 20 years, has resigned. **C. H. McNeill,** secretary and treasurer, has been elected to the board of directors, and will continue his duties in charge of the general office at Cincinnati. **Houston C. Rogers** was appointed district manager in charge of operations, Cincinnati office. Mr. Rogers has been associated with the company in the coal department for the past 20 years and at present is a member of the Solid Fuels Advisory War Council. He also served for two years as president, American Coal Sales Association. **L. C. Snyder,** Cincinnati, has been named resident manager of that office.

—o—

Milton F. Beecher, director of research, Norton Co., Worcester, Mass., has been awarded an honorary degree of Doctor of Engineering by Iowa State College, Ames, Iowa. Mr. Beecher also was honored by the presentation of the merit award by its alumni associations.

—o—

J. L. Ray has been named head, Gas and Steam Turbine Engineering Division, Joshua Hendy Iron Works, Sunnyvale, Calif. He formerly was chief gas turbine design engineer, Allis-Chalmers Mfg. Co., Milwaukee.

—o—

Carl A. Backer, for the past four years factory manager, Cameron Iron Works Inc., Houston, Texas, has opened offices in Houston as a manufacturers' representative for Michigan Tool Co., Colonial Broach Co., Detroit Tap & Tool Co., Colonial Bushings Inc., Tungsten-Carbide Co., Inc., all of Detroit, and Genesee Tool Co., Fenton, Mich.

—o—

F. R. Bacon, founder and president, Cutler-Hammer Inc., Milwaukee, has been elected chairman of the board, and is succeeded as president by **G. S. Crane,** formerly vice president in charge of sales and engineering. **H. F. Vogt,** in addition to continuing as vice president and treasurer, has been named chairman of the executive committee. **J. C. Wilson** is vice president and secretary. The following former department heads have been elected to these executive posts: **P. B. Harwood,** vice president in charge of engineering; **P. S. Jones,** vice president in charge of sales; **Philip Ryan,** vice president in charge of manufacturing,; **E. W. Seeger,** vice president in charge of development, and assistant secretary; **M. R. Fenno,** assistant treasurer; and **J. C. Springer,** assistant secretary

—o—

William R. Manske has been appointed works manager of the Denver plant, Amsco Division, American Brake Shoe Co., New York. Mr. Manske has been acting works manager at Denver since June, 1944, and has been associated with the company since December, 1936, when he organized the Amsco apprentice training course.

—o—

Francis X. Ferguson, formerly with American Steel & Wire Co., Cleveland, and recently placed on the Army officers inactive list, is assistant district manager, Worcester, Mass,, for Charles Dreifus Co., scrap broker.

—o—

Frank E. Murphy, formerly assistant to manager, research and development department, has been appointed director of development of the research and development department, Pennsylvania Salt Mfg. Co., Philadelphia. He will be at Whitemarsh Research Laboratories.

—o—

Stephen J. Pylar, for the past 17 years connected with Chevrolet-Forge Division, General Motors Corp., is now plant manager, Billings & Spencer Co. Hartford, Conn. Previous to his position with the Chevrolet-Forge Division Mr. Pylar was associated with Timken-Detroit Axle Co., Detroit.

—o—

William L. Batt, vice chairman, War Production Board, and president, SKF Industries Inc., Philadelphia, will continue as chairman of the board, American Management Association, N. Y.; **Thomas Roy Jones,** president, American Type Founders Sales Corp., Elizabeth, N. J.

has been elected vice chairman; **Alvin E. Dodd,** president; **Keith S. McHugh,** vice president, American Telephone & Telegraph Co., chairman, executive committee of the association.

—o—

Cleveland Pneumatic Tool Co., Cleveland, has announced promotion of four executives: **Elmer J. Steger,** manager, Pneumatic Tool and Appliances Division has been appointed manager also, Cleveland Rock Drill Division; **Charles E. Vanderpool,** former assistant manager of the Pneumatic Tool Division has been named sales manager of that division; **Albert H. Hruby,** recently in charge of contract termination, has been named sales manager, Cleveland Rock Drill Division; and **Robert Craig** has been named manager of export sales.

—o—

Roy C. Miller, assistant director of purchases has been promoted to director of purchases, Fisher Body Division, General Motors Corp., Detroit, succeeding **Claude A. Crusoe** whose resignation from that position became effective July 1. **M. E. Sheppard,** assistant comptroller succeeds **Lewis D. Crusoe** as Fisher Body comptroller, effective July 15.

—o—

Forest W. King has been appointed works manager, Warren City Mfg. Co., Warren, O., subsidiary of Graham-Paige Motors Corp., Detroit.

—o—

M. R. Schwartz, former production manager, John Oster Co., Racine, Wis., has become director of purchases, Conlon Corp., Chicago.

—o—

Robert R. Hirsch has been elected vice president in charge of sales, Bunting Brass & Bronze Co., Toledo, O. Mr. Hirsch joined the organization in January, 1944 as sales director.

—o—

Clyde Williams, director, Battelle Memorial Institute, Columbus, O., was presented the degree of Doctor of Science at the recent convocation ceremonies, Case School of Applied Science, Cleveland.

—o—

S. Riley Williams has been appointed director of international business, Worthington Pump & Machinery Corp., Harrison, N. J. Mr. Williams will be responsible for the administrative direction of the company's foreign and export activities and will supervise the operation of the organization's associated companies in foreign countries.

—o—

Bert W. Reynolds has been named appliance sales manager, San Francisco district, General Electric Co., Schenectady. He formerly was manager of domestic sales, Pacific Gas & Electric Co., San Francisco.

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Sidney E. McCrum has been appointed assistant advertising manager, Wickwire Spencer Steel Co., New York. Mr. McCrum previously served as assisant to the advertising manager, Chicago Pneumatic Tool Co., New York.

—o—

Ralph E. Middleton has been elected vice president, Aireon Mfg. Corp., Burbank, Calif., to be in charge of engineering of the company's Hydraulic Division. He has been serving as chief engineer for the company.

—o—

Thomas J. Quinn has been elected chairman, W. F. Potts, Son & Co., Inc., Philadelphia, and **R. P. Farrington** was elected president. Mr. Quinn retired as president of the organization on the fifty-fifth anniversary of his employment with the company.

—o—

Westinghouse Electric Corp., Pittsburgh, has announced the awarding of its Order of Merit, the highest award the company bestows upon its employes, to the following: **George H. Woodard,** manager, Aviation Gas Turbine Division, South Philadelphia, Pa.; **H. W. Tenney,** assistant to vice president in charge of the company's Pittsburgh divisions; **Charles A. Scarlott,** editor, *Westinghouse Engineer;* **Charles A. Powel,** manager, headquarters engineering departments; **James H. Jewell,** manager, industry sales departments; **Robert D. Blasier,** an attorney in the law department; and **Milton F. Meissner,** assistant to vice president in charge of purchases and traffic.

—o—

Edward Gammie, formerly industrial sales manager, Victor Mfg. & Gasket Co., Chicago, has been appointed general sales manager. Associated with the company since 1930, he has in recent years supervised application of the company's products to needs of the Army and Navy

—o—

N. F. Lawler has been appointed director of advertising and sales promotion, Nash Motors Division, Nash-Kelvinator Corp., Detroit. Mr. Lawler succeeds **C. D. Wing** who leaves to rejoin Maxon Inc., Detroit.

—o—

A. F. McGraw has been named director of sales, Food Machinery Corp., San Jose, Calif. Mr. McGraw formerly was general sales manager, Tractor Division, Allis-Chalmers Mfg. Co., Milwaukee. **A. J. Flebut** has been named western manager, Niagara Sprayer & Chemical Co. Inc., Middleport, N. Y., a subsidiary of Food Machinery Corp. Mr. Flebut's headquarters will be in Richmond, Calif.

—o—

Reuben E. Sommer, who has been vice president and general manager of the Keystone Steel & Wire Co., Peoria, Ill., has been elected president of the company to succeed **W. H. Sommer** who had been president for the past ten years. Mr. Reuben Sommer will also serve in the capacity of general manager. Other changes in management of the company include election of **Henry G. Sommer,**

G. H. DOWDING

Recently named director, industrial relations, Chicago district, Carnegie-Illinois Steel Corp., as noted in STEEL, June 25, p. 105

A. G. KESSLER

Who has been appointed manager of sales, Midwestern district, Farrel-Birmingham Co. Inc., as noted in STEEL, June 18, p. 94.

S. LEROY CRAWSHAW

Who has been named manager of engineering and sales, Western Gear Works, as noted in STEEL, June 4, p. 94.

formerly executive vice president and treasurer to the post of chairman of the board, a newly created position; **D. P. Sommer,** formerly vice president and general superintendent, to executive vice president in charge of operations; **W. O. Fritez,** formerly secretary and assistant treasurer to vice president and treasurer; **Walter V. McAdoo,** formerly secretary to the executive committee and director of public relations, to vice president and secretary.

—o—

Chester Berenger, Bradley Wash Fountain Co., Milwaukee, has been elected president, Milwaukee Association of Industrial Advertisers. Other officers elected are: **A. A. Meyer,** Le Roi Co., Milwaukee, vice president; **Edwin Hamilton,** Delta Mfg. Co., Milwaukee, secretary-treasurer; and **J. S. Trudgeon,** Cutler-Hammer, Inc., Milwaukee, director.

—o—

John F. Hutson has been named district sales manager for the Chicago territory, Railway Sales Division, National Malleable & Steel Castings Co., Cleveland. **Frank E. Moffett** becomes assistant district sales manager for the Chicago territory.

—o—

Dr. Charles M. A. Stine has retired as a member of the executive committee, E. I. du Pont de Nemours & Co., Wilmington, Del., and as its advisor on research and development. He will retain his positions of vice president and director. Dr. Stine will be succeeded on the executive committee by **Roger Williams,** assistant general manager, explosives department. Mr. Williams was elected a vice president and member of the board of directors and will serve as advisor on research and development.

—o—

William J. Morris, president, Continental Supply Co., Dallas, Tex., subsidiary of the Youngstown Sheet & Tube Co., Youngstown, O., has been named chairman of the board. **Frederick M. Mayer,** formerly vice president and treasurer, has been made president and treasurer; **Frank I. Brinegar,** vice president, has been appointed executive vice president and a director.

—o—

E. J. Hergenroether who recently resigned as chief, metallurgical branch, Steel Division, War Production Board, Washington, has resumed his duties with the Development and Research Division, International Nickel Co. Inc., New York. Mr. Hergenroether will be in charge of the division's automotive steel development and will make his headquarters in Detroit.

—o—

Harold W. Macintosh, L. O. Koven & Bro. Inc., Jersey City, N. J., has been elected president, Purchasing Agents Association of New York. He succeeds **Millard W. Merrill,** purchasing agent, United States Metals Refining Co., New York. Other officers elected are: Vice presidents, **Frederic W. Thomas,** Worthington Pump & Machinery Corp., Harrison, N. J., **Harold G. Butterfield,** National Union Radio Corp., Newark, N. J.; treasurer, **Edward B. Fielis.** Executive committee members: **G. W. Howard Ahl,** Columbia Ribbon & Carbon Mfg. Co. Inc., Glen Cove, L. I., N. Y.; **Donald H. Lyons,** Johns-Manville Corp., New York; **John F. Snedeker,** Binney & Smith Co., New York; **Harold T. Moffett,** National Lock Washer Co., Newark, N. J.

—o—

Albert F. Stuebing has been appointed assistant to manager of sales, High Strength Steel Division, Carnegie-Illinois Steel Corp., Pittsburgh. Mr. Stuebing served previously as development engineer, sales department, Market Development Division.

—o—

George P. Messenger, for the past 16 years chief metallurgist, Kensington Steel Co., Chicago, recently became associated with Rushlight Steel Works, Portland, Oreg., as works manager and metallurgist.

—o—

J. C. Lucas has been appointed by Meehanite Metal Corp., New Rochelle N. Y. to establish a new management engineering department. Mr. Lucas formerly was assistant to the general superintendent, Bucyrus-Erie Co. at Erie, Pa.

—o—

Nelson B. Buehrer has become connected with the F. J. Evans Engineering Co., Birmingham, and will direct sales of heating and air conditioning equipment. Mr. Buehrer formerly was associated with Surface Combustion Corp., Toledo, O. **D. A. Newton** has joined the Evans company as air-conditioning engineer, Heating & Air Conditioning Division. His headquarters will be in Atlanta .

OBITUARIES . . .

John Bradley Carse, 81, who retired in 1935 as director of purchases, United States Steel Corp., New York, died there June 24, after a brief illness. He was graduated from Williams College in 1886, spent his early business career in Chicago and in 1903 moved to New York, where he began his association with the United States Steel Corp.

—o—

John W. Murphy, 53, manager of sales, rails and accessories, Bethlehem Steel Co., Bethlehem, Pa., died suddenly in that city June 24. Mr. Murphy had been associated with Bethlehem Steel Co. since 1923.

—o—

James G. Scrugham, United States senator of Nevada, died recently in the San Diego Naval Hospital, San Diego, Calif. Senator Scrugham had sponsored a bill in 1943 which provided for the stockpiling of strategic minerals by government purchase immediately following the war.

—o—

John Morgan Thomas, 86, retired president, Thomas Furnace Co., Milwaukee, died recently in that city. Mr. Thomas served at one time as president, Niles Fire Brick Co., Niles, O., and was secretary, Mahoning Valley Steel Co., Niles, at the time of his death.

—o—

Peter B. Selter, 69, secretary-treasurer, Michigan Engine Valve Co., Detroit, died recently at his home in that city. Mr. Selter was proprietor of the Fulton Iron & Engine Works for 25 years.

—o—

William E. Wendnagel, 74, a partner in Wendnagel & Co., Chicago, until his retirement three years ago, died June 23 in that city.

—o—

Simon Lake, 79, inventor of the modern submarine, died June 23 in Bridgeport, Conn.

—o—

Willis Timothy Burns, 78, manager of the Raritan Copper Works, Perth Amboy, N. J., died at his home in Plainfield, N. J., June 23.

—o—

John P. Crandall, 70, president and founder, Crandall Can Filler Machine Co., Buffalo, died June 23 at his home in that city.

—o—

Bert Graves, 65, secretary and assistant to the president, West Steel Casting Co., Cleveland, died June 19 at his home at Perry, O. Mr. Graves became associated with the West Steel Casting Co. in 1941, and previously had been associated with White Motor Co. and predecessors for 42 years.

—o—

A. D. Starling, 68, president, Virginia Hardware & Mfg. Co., Danville, Va., died June 20.

—o—

Foster Milliken, 80, president, Milliken Valve Corp., New York, died recently in that city.

—o—

Edwin Crowley, 68, president, Crowley Fence Co., Minneapolis, died in that city recently.

—o—

Myron J. Czarniecki, 53, vice president in charge of sales, A. M. Byers Co., Pittsburgh, died June 18 at his home near Pittsburgh.

—o—

Joseph Kerber, 49, vice president and chief engineer, Hi-way Service Corp., Milwaukee, also a director, Drott Tractor Co., Milwaukee, died June 21 in that city. Mr. Kerber had been an employe of the two companies for the past 20 years.

Surplus Tool Stock Urged as Insurance Against Future Need

Speaker at sectional meeting of American Society of Mechanical Engineers says government should retain minimum of 50 per cent of machines it now owns. Advances three general recommendations for solving surplus tool problem

A. G. BRYANT

THE SURPLUS of machine tools and other capital equipment brought about by wartime production may, under a sound public policy, become this country's most potent instrument for building economic prosperity and for maintaining international peace, A. G. Bryant, vice president, Cleereman Machine Tool Co., and president, Bryant Machinery & Engineering Co., Chicago, told the American Society of Mechanical Engineers, Chicago Section, at the luncheon session, June 19, of the two-day technical program at Chicago.

Mr. Bryant has been a member of the industrial advisory committee of the War Production Board since Pearl Harbor. He recently returned from Washington where he went as advisor to the Reconstruction Finance Corp. on surplus property disposal.

He submitted three general recommendations for solving the problem of surplus as follows:

1. "Let the President and the Congress establish promptly a policy which will require the setting aside as a strategic military reserve, a minimum of 50 per cent of the general purpose machine tools and production equipment that have been owned by the government during the war period.
2. "Let the Congress clarify and simplify the Surplus Property Act by first establishing a single administrator with full authority and responsibility and who may have for his support an advisory council, and by eliminating the futile restrictions as to priority of sale, reviews by the attorney general, and other provisions of the present act which create confusion and cause unnecessary delay.
3. "Let the President and the Congress instruct the administrator and his subordinate organizations to act boldly, fearlessly and with complete authority in developing co-operative arrangements with industry for the utilization of remaining surpluses."

Machine tools, such as heavy power driven lathes, drilling machines, planers, milling machines, grinders and power driven metal cutting machines, are essential in the manufacture of planes, guns, tanks, ships, radar and every other item constructed of metal, and as such are a first essential in any nation's defense program, the speaker pointed out.

Hitler built up the machine tool industry of Germany so that Germany was capable of producing weapons of war to maintain a mighty military machine for five years. America had made no similar effort to prepare. Before war broke out in 1939, France and England made large purchases of machine tools and started the industry in this country on an expansion program. When America was attacked, production had been accelerated to the point where the overwhelming need could be met.

Previously the industry's annual volume had never exceeded $200 million with an average of $100 million. In 1940 it skyrocketed to $450 million; in 1941 to $750 million, and in 1942 to $1320 million. In four years it had produced in dollar volume the equivalent of the previous forty.

Period of Huge Output Is Past

The phase of the war which was marked by this production miracle is over, Mr. Bryant said. Continuing production requirements are only those for new emergency military needs and for the special demands for conversion to peacetime production. The speaker cited figures showing that by the end of this year there will be available, both in government and privately owned business, approximately one and three-quarters million machine tools. The United States holds title to over 700,000 on this continent alone. "Can we use this much modern machinery? What will happen to the country if we do use it, and what will happen to the machine tool industry if the surplus is allowed to smother its future markets?

"The industry which the War Department, the Navy Department and the War Production Board exhorted in 1941, '42 and '43 to produce machine tools so that the country might be saved, has been bled by an unfair excess profit tax basis, stabbed by an unjust renegotiation procedure and left in a weakened condition to survive as best it may," said Mr. Bryant.

"The machine tool industry did not expect to make excessive profits out of the war. However, the machine tool industry has produced during the war the machines which, because of their 20-year average life expectancy, should have been built and sold in the peacetime decade after the war. Ninety-five per cent of the machines that have been built during the war can be used as standard general purpose machines for the production of peacetime products.

"The industry has produced, therefore, most of the normal business which it should have done in the postwar period, and in accomplishing this production miracle for the country it has paid a 95 per cent excess profit tax and has been renegotiated ruthlessly, as compared with the treatment of producers of war materiel, whose products have been expended in battle and who have their full peacetime markets waiting for them.

"After renegotiation, typical machine tool builders are retaining not more than three cents out of every dollar of sales, and machine tool distributors less than one cent per sales dollar. Being primarily engineers and not accomplished in the arts of financial manipulation which enables more fortunate businesses to fare well during the war, the machine tool industry looks for someone from within government or out to suggest how it can maintain financially in the future its organization and its facilities to conduct the engineering research which America demands and which success in the future requires.

"Nevertheless, in the face of what has seemed to many a ruthless disregard by government of the economic life of a basic element in American industry, there has been a most patriotic and statesmanlike attitude towards the solution of the surplus problem.

"Committees of the National Machine Tool Builders' Association and the American Machine Tool Distributors' Association in the spring of 1944 presented a policy for disposition of machine tools. It emphasized the need to give the armed services a chance to acquire insurance against future emergency as a strategic reserve; suggested that lessees of government-owned machine tools be given options to buy these when released; and that other machines be of-

(*Please turn to Page* 182)

WING TIPS

Immediate planning to maintain technological progress in postwar aviation urged by aircraft committee of National Planning Association. America's responsibilities for world security require air forces of most advanced design

PROMPT planning to assure maintenance of the technological core essential to the development of postwar aviation is urged by the Advisory Committee on Aircraft Industry of the National Planning Association, Washington. The agriculture, business, labor and international committees of the association joined in the aircraft committee's recommendation.

The aircraft industry obviously is faced with a drastic postwar shrinkage which in the absence of any planned program of transition may result in the stoppage of vital technological development for an indefinite period, the committees state. America's responsibilities for world security will require air forces of the most advanced design. It is essential to plan promptly a program of postwar military aircraft procurement, so as to avoid any interruption in the transition period that would endanger the long-term development of civil or military aviation. "The momentum of technological development should not be allowed to collapse while our long-term policies for military aircraft procurement are being established," the committees assert.

The V-Day problem of military aircraft procurement was prepared by the advisory committee on the aircraft industry, under chairmanship of Edward Warner, vice chairman, Civil Aeronautics Board. The committee, which was appointed by NPA in March of this year, is composed of approximately 35 representatives from government, labor, and the industry.

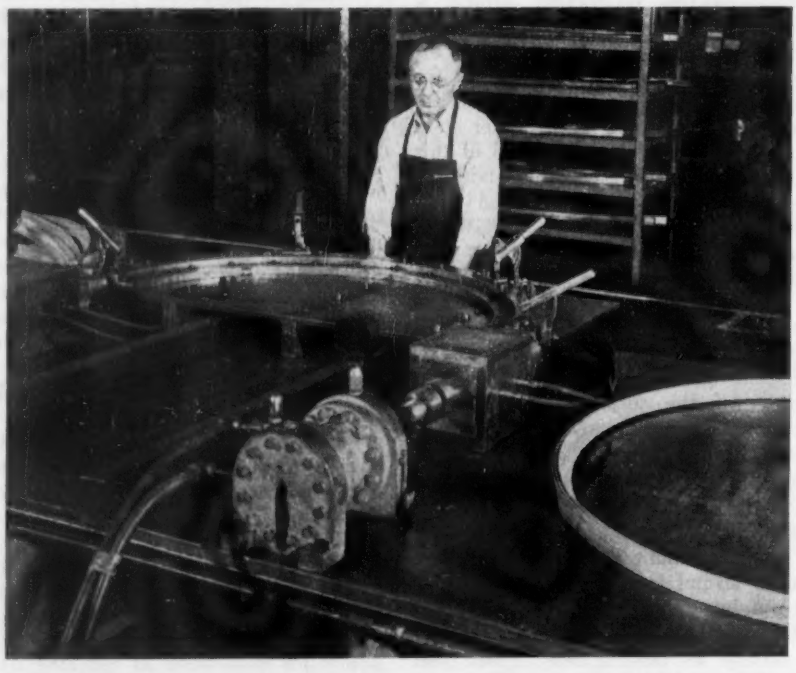
The advisory committee report, which prompted the joint resolution by the parent NPA committees, points out that the present legal basis for continuing any war contracts after V-J Day "appears tenuous" because of the statutory requirement (Section 202 of the War Mobilization Act) for termination of contracts where "performance thereof is not needed for the prosecution of the war."

"If this continues to be our national policy," the report states, "there will be a complete interruption of military procurement for an unpredictable length of time."

The advisory committee makes no assumption or recommendation as to the size of air forces America will need. It is not concerned with the fate of any one company and recognizes that in the inevitable postwar curtailment of production, particular companies may fail. It is chiefly concerned "with the preservation of the aircraft manufacturing industry as a whole and recognizes that if the aggregate of skills possessed by the industry—research, engineering, labor, and management—is dissipated by complete stoppage of production, the technological loss may be irrecoverable, especially in view of the rapid tempo of technological progress."

The report said that civilian production will fail to adequately provide for postwar military technical development for two reasons: First, because "Civilian aircraft, especially personal planes, are basically different from military types," and second, because "any volume of civilian manufacture presently anticipated will be entirely inadequate to maintain a nuclear manufacturing industry of strength necessary for expansion in time of emergency.

"Knowledge of the postwar level of operations will enable the manufacturers to plan intelligently for the future and to keep together organizations of skilled management and labor," the report points out. "Without such knowledge, many companies may feel it necessary to close down and hoard their assets pending clarification of the outlook. If the industry as a whole knew now the approximate level to which it would shrink on the basis of postwar procurement, a much more orderly liquidation would be possible with less unsettling effects on the national economy and on the lives of the several million people most affected."



STRETCH FORMING: Replacing hand hammering methods for finishing aluminum extrusions for bomber parts, this stretch forming machine, built from discarded automobile body equipment, enables a workman to complete more than 200 parts daily. The machine was designed by and is in use at Fisher Body's Detroit aircraft unit, manufacturer of nearly 2500 parts and 400 assemblies for heavy and medium bombers

Convair To Build Voyager At Nashville Division

The Voyager 125, one of the five Stinson personal airplanes to be built by Consolidated Vultee Aircraft Corp. for the civilian market, will be produced at the company's Nashville Division, with the first craft scheduled to be completed in October. Stinson hopes to market the four-place plane for approximately $5000.

The prototype already has been turned out at the Stinson Division of Convair, at Wayne, Mich. A second ship is nearing completion there.

Disclosure followed an announcement from Chicago by J. C. Welsch, private sales director for Convair, that the company will produce a postwar line of Stinson personal aircraft ranging from a two-place model to a twin-engined five or six-place junior executive transport. The line of planes will be marketed through the Stinson nationwide distributor-dealer organization, and will be manufactured at Convair's Stinson and Nashville divisions.

The Voyager 125, will have a maximum speed of 128 miles per hour, a maximum

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endurance of five hours and a service ceiling of about 18,800 feet. The plane's cruising range will be 580 miles, which would make it possible to fly from Nashville to San Diego, Calif., with from four to five refueling stops. The plane will have a cruising speed of 116 miles per hour and a rate of climb of 670 feet per minute. It will take off at sea level within 550 feet and have a landing run of 280 feet.

The craft will have modern appointments and accessories, including a finger tip control parking brake and an electric selfstarter.

Lasser Issues Manual On Contract Termination

To pave the way for quicker settlement of terminated war contracts and to aid in getting maximum allowable return a new book has been prepared by J. K. Lasser, author of income tax handbooks, under the title, *How To Speed up Settlement of Your Terminated War Contract.*

This book shows, step by step, what to do, how and when to do it, how to handle plant operations, inventories and settlement before and after receiving a termination notice.

Reproductions of actual forms are presented, annotated by references to instructions for each step in preparing reports.

The book contains 186 pages 8 × 10½ inches, bound in boards. It is published by McGraw-Hill Book Co. Inc., 330 West Forty-second street, New York 18, for $3.50.

Curtiss-Wright Corp. Will Contest NLRB Ruling on Unionization of Foremen

SHARP disagreement with a National Labor Relations Board ruling that foremen are not a part of management in the Curtiss-Wright Corp. was voiced last week in a policy statement by Guy W. Vaughan, Curtiss-Wright president.

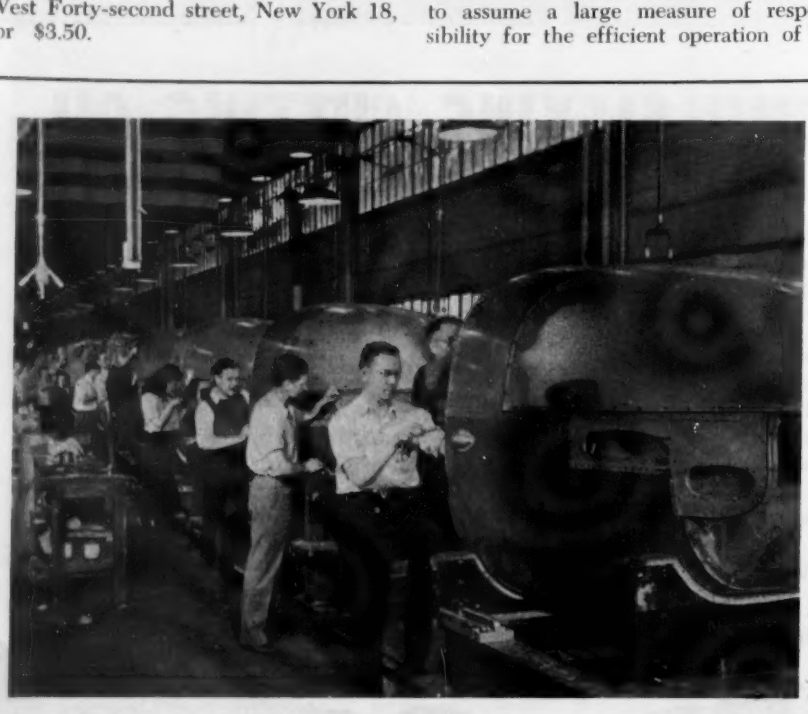
"Developments growing out of the recent reversal of policy by the National Labor Relations Board with regard to foremen's unions prompt the Curtiss-Wright Corp. to make its position clear on this issue," said Mr. Vaughan. "By a vote of two of its three members this government agency decided that under the circumstances of an individual case foremen were not management within the meaning of the National Labor Relations Act and hence constituted an appropriate unit for collective bargaining. Curtiss-Wright Corp. sharply disagrees with this decision of the board and believes that, if it is not reversed, it will do great harm not only to foremen but to rank and file employes as well. The corporation takes vigorous exception to a decision of a federal board which inaccurately describes responsible representatives of management as the "traffic cops" of industry.

"Throughout the years Curtiss-Wright has believed and has practiced the belief that its foremen are a vital element of management. It has been the policy of the corporation to require its foremen to assume a large measure of responsibility for the efficient operation of its plants. Upon the foremen has fallen the indispensable duty of seeing that scheduled work is turned out, that essential quality is achieved and maintained, that good work is discovered and rewarded and poor work detected and rejected, and that the discipline required in a modern factory is established and preserved.

"The rank and file of employes know that this is what foremen do and they consider their immediate supervision to be members of the managerial staff of the company. Foremen would promptly lose the prestige they now have in the minds of the employes if they should by their own volition or by the order of the government separate themselves from management.

"Curtiss-Wright is convinced that foremen's unions would create an unnatural distrust between levels of management and destroy the unity of supervision so essential to the success of any enterprise. The supervisor favoring a union inevitably would become pitted against the supervisor favoring another union, or no union, and collective bargaining in itself is not insurance against such industrial disruption. In fact, experience indicates there is no more fertile source of strikes and disturbances than jurisdictional disputes among competing unions. At the same time foremen's unions would become involved in the strikes of rank and file unions, whether they wanted to or not. No quicker way to disrupt management could have been devised by the National Labor Relations Board.

"Curtiss-Wright will vigorously resist the inclusion of any level of supervision exercising genuine managerial functions in a collective bargaining unit. It is clear that unions of those who exercise managerial functions will neither advance the individual interests of their members nor the industry which they serve. To encourage or promote division of management is opposed to the national interest in time of war, and will add to the difficulties of industrial reconstruction after the war."



WHERE THE STING COMES FROM: Workers at the Briggs aircraft plant in Detroit are shown making fire power nose sections for Douglas attack bombers

WPB Orders Increase in Magnesium Production

New war demands are expected to push magnesium production considerably above the April total of 6,412,000 pounds of primary output and 2,784,000 pounds of secondary recovery, the War Production Board said recently. The expected increase in production will result from the recently ordered reopening by WPB of the Defense Plant Corp. plant at Velasco, Tex., and the step-up in operations to 100 per cent of DPC plants at Painesville and Lucky, O.

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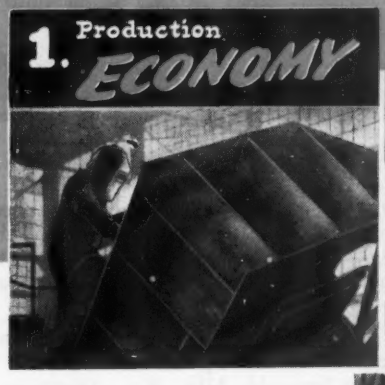

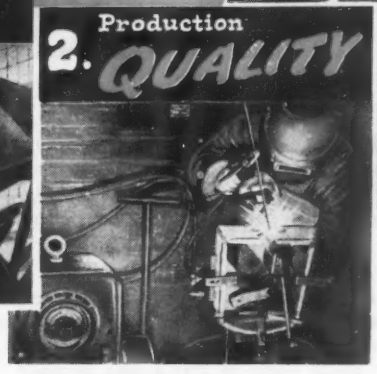

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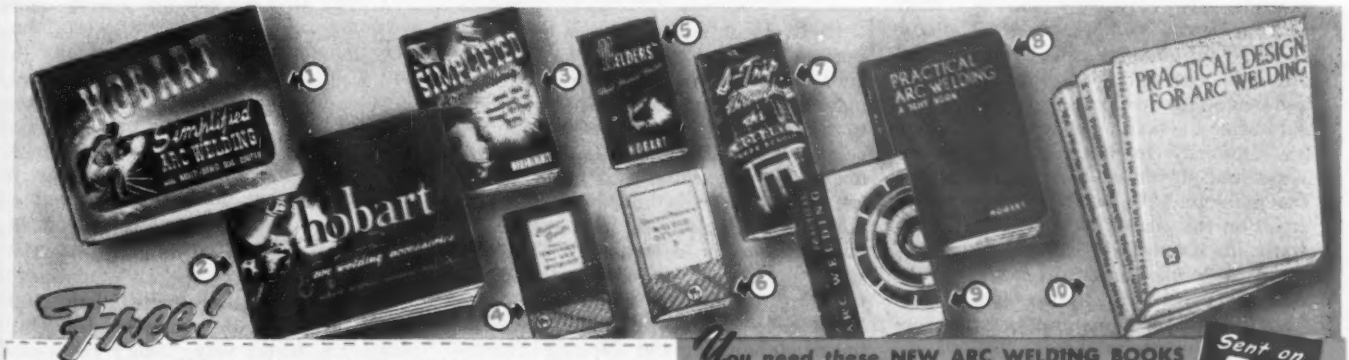

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Postwar Problems Of Light Metals Industry Discussed

Disposal of government-owned plants commands attention at two-day meeting in Seattle. Postwar value seen hinging on economical peacetime utilization. Committee named to campaign for western industry

SEN. WARREN G. MAGNUSON

SEATTLE

FUTURE of the light metals industry in the western states was discussed at the regional conference of the Western States Council here June 21-22. Large producers of aluminum and magnesium, fabricators, small manufacturers, government officials and scientists presented their viewpoints, considering the postwar problems in the light of present conditions.

Several speakers emphasized the wish of the government to dispose of war plants as speedily as expedient but they also stressed the view that no monopoly be tolerated. Just after a conference with President Truman, who was vacationing in Washington state, Sen. Warren G. Magnuson, Washington, said he had authority to state the President was sold on the idea that light metals can be produced in Washington cheaper than elsewhere.

"The government policy," said Senator Magnuson, "is to dispose of war plants to private industry as quickly as possible. No one now can tell their postwar value. Congress knows the cost of these installations cannot be realized 100 per cent but I am sure aluminum and magnesium will be in the competitive field after the war. Defense Plant Corp. has authority to lease plants for five years and this may be the solution of the problem. We can't put these properties on the market as such. Their postwar value is uncertain and will depend on their peacetime uses. The leasing arrangement will give prospective buyers opportunity to determine what these plants are worth to them.

"Another uncertain factor is the international situation where before the war aluminum was in one of the tightest cartels ever formed. Something will have to be done so that our product can enter the field. I believe a fair arrangement can be worked out.

"Again I think the Justice Department should re-examine all contracts to see that they do not foster monopoly. Congress is concerned with the suggestion that plants in other sections be moved here to form an integrated industry. The power situation in the West is favorable."

Irving Lipkowitz, economic advisor, Department of Justice, urged immediate action in integrating the industry here "while there is still a war demand to meet," adding "the plants offer the quickest means for getting independence started in the western aluminum industry."

Cheap power, high quality labor and favorable climate were the three favorable factors stressed by John D. Sullivan, Battelle Memorial Institute, Columbus, O., but in contrast he named lack of sufficient population to become a large consumer, distance from markets and unfavorable freight rates as the disadvantages which the West faces.

Summarizes Aircraft Needs

H. O. West, executive vice president, Boeing Aircraft Co. told "What the Aircraft Industry Wants" under five headings: Sources of materials should be close to the factories; phases of the industry should be closely integrated; close cooperation in research and development; improved materials and lower material costs. These objectives, he stated, would eliminate costly delays and confusion, speed production and enable the industry to compete to better advantage. Present procedure, he added, involves too much handling and shipping of materials and parts. He advocated development of local sources of raw materials and said that while available materials are not unsatisfactory, increased workability should be achieved by simplified processes. These objectives can be attained by integration of the industry in the West, resulting in greater economy. Better scrap reclamation and lower inventories would tend to reduce costs. He predicted that Boeing, subject to military needs and the end of the war, would participate to the fullest extent in postwar production of aircraft.

The problems of the small manufacturer were presented by L. D. Milbrad, Jensvold Mfg. Co., Olympia, Wash., and A. A. Kearney, Brown Industries, Spokane, Wash., who advocated equitable distribution of war plants, integration of all factors involved and discounted the advantages of government subsidies. They urged that producers of light materials demonstrate to fabricators how their products can best be used in new fields of manufacturing.

"Some Problems and Developments in the Disposition of Surplus War Plants" was discussed in a paper by Hans A. Klagsbrunn, executive vice president, Defense Plant Corp., who outlined what the government is doing at this time to prepare for the postwar period.

"I think that we can put a very high percentage of these plants to work," he said in conclusion. "It is simply a matter of finding intelligent, practical devices for doing so. Obviously we can't settle these problems now, nor do I think it necessary because I believe we will have a hungry world, a hungry market at home and abroad for our products. If we don't put the plants to work we will also have hungry men and women."

He declared that more than 200 negotiations for the sale or lease of plants are under way, taking the position it is a mistake to wait until a plant has become surplus. "It would mean that war contracts of the plant had been terminated, labor dispersed, people going hungry, etc. And the question of opening that plant means finding labor anew for its operation." He stated that government investment in industrial facilities is between $16 and $17 billion, of

which $3¼ billion are in aircraft plants, $1 billion in steelmaking capacity, blast furnaces, open hearths, coke ovens and electric furnaces, fabrication lines, heavy armor plate, etc.

Speaking of aluminum plants, he pointed to the many unknown factors including markets, power and sources of bauxite. Of bauxite supplies he said: "Will they be in South America, the Caribbean? How about the sources in the Pacific? The Dutch East Indies? Indo-China? All these are potentialities and unknowns. They will determine whether the plants in the present locations can be operated economically; whether there shall be a rearrangement of the present construction; whether fabrication plants should be moved closer to the aluminum ingot or closer to the market of the fabricated products, etc. These unknowns should not discourage us and we should try to determine ways and means of putting these plants to use in the light of these unknowns.

"I haven't touched on those large economic problems that we often discuss such as what will aluminum and magnesium do to steel; What will plastics do to both? Can they complement each other or will one drive the other out?"

"What Congress Plans" was the topic of Dewey Anderson, executive secretary, Senate Special Committee to Study Problems of American Small Business. He stated that as Congress is influenced by public opinion, the future of the light metals industry in the West would depend largely upon the interest taken in the effort to retain that industry.

"If we can get a 1-mill combination rate on power," stated David P. Reynolds, Reynolds Metals Corp., "we are prepared to expand our present Washington production tremendously. There is absolutely no limit to the postwar possibilities for this state if the cheap power can be provided."

The following committee was appointed by Christy Thomas, president, Western States Council, to carry on the campaign for the light metals industry in the West, using the information made available by the two-day conference: D. K. MacDonald, D. K. MacDonald Co., Seattle, chairman; Al Bauer, manager, Oregon Shipbuilding Corp., Portland; John Beall, president, Beall Pipe & Tank Co., Portland; Benjamin Benovski, School of Mines, New Mexico; Earl Braden, Spokane Paper & Stationery Co., Spokane; James L. Bradford, general manager, Magnesium Casting Co., Las Vegas, Nev.; John Bradley, president, Bradley Mining Co., Boise, Idaho; Ernest L. Mathy, Victor Equipment Co., San Francisco; Maurice Mann, New Castle, Wyo.; Tom Moffett, Hooker Electrochemical Co., Tacoma, Wash.; A. F. Moriarty, Phoenix, Ariz.; Bryant Myer, general manager, Kinney Aluminum Co., Los Angeles; Harlan Peyton, Peyton Investment Co., Spokane; Dr. Delworth Walker, U. of Utah; James E. Lauttit, Seattle, secretary.

Expect McKee Survey of Western Steel Industry and Markets Soon

Results of detailed study of government-owned plants with recommendations for postwar operation to be turned over to RFC early in July. Kaiser interests press for prompt government decision on Fontana refinancing

SAN FRANCISCO

DECISIONS may be made within the next month or two which will have a far-reaching effect on the West Coast's postwar industrial economy.

They will concern disposal of the Geneva steel mill, owned by the government, and refinancing of the Fontana steel plant, owned by Henry J. Kaiser. What will be done with these wartime installations, built at a cost of more than $300 million will be decided by the Reconstruction Finance Corp.

Based on recent developments in Washington and on the West Coast, the timetable of forthcoming events may go something like this:

Early in July Arthur G. McKee & Co., Cleveland engineering firm, will turn over to the RFC its survey of the western steel industry and markets, together with its recommendations for postwar operations and prospects.

After a reasonable time for analyzing the report, the RFC is expected to announce its plans for putting up the Geneva plant for sale. All indications up to now point to disposal of the plant by auction.

Fontana Decision Would Follow

Then, after plans for Geneva have been completed and announced, a decision will be reached on the Fontana mill. The Defense Plant Corp., subsidiary of the RFC, has indicated that any action on Fontana will be postponed until after the Geneva question is settled.

Meantime, Mr. Kaiser and his interests have not been idle. Daily conferences have been held with the RFC in Washington at which Mr. Kaiser has been presenting his case for postwar operation of Fontana and negotiating for a basis of refinancing the government loan, which now amounts to around $84 million, after amortization of about $27 million of the original advance.

California congressmen, who not long ago petitioned the RFC to take speedy action on the Fontana case, lustily renewed their demands.

One spokesman, Rep. Cecil King (Dem., Calif.), said:

"Speed is the main factor in this transaction. Unless Kaiser can get into peacetime production fast, the orders for steel will be placed elsewhere and he will have no markets."

Representative King also indicated that Mr. Kaiser was becoming somewhat impatient over delays in deciding Fontana's future.

The RFC has taken the attitude that to put Mr. Kaiser in a position now to operate Fontana for peacetime purposes would put prospective buyers of the Geneva plant in an unfair competitive status. Naturally, the government, with a bigger stake in Geneva, is anxious to get satisfactory terms for that plant.

Replying to that viewpoint, Representative King said:

"If the RFC is out to protect its investment in these plants the obvious thing to do is to insure them continued operation. Preventing one or both of them from preparing for peacetime operation so they can compete for postwar markets is a sure way of losing the public's money on them."

Of course, it remains to be seen if there is a postwar place for both plants. It depends on the peacetime markets for steel in the West. On the basis of statistics alone, operation of both plants would create a large over-capacity. However, potential growth of this area possibly could absorb this margin of over-production.

Rep. Helen G. Douglas (Dem., Calif.) regards Fontana as the key to an industrial economy which would support thousands of workers eventually to be released from war plants.

"These people need some guarantee that they will have work," she said. "Other industrialists of the Pacific Coast want to know where their steel will come from. We must keep Fontana as a peacetime plant."

Interstate Reconversion Board

At a recent conference of western officials dealing with inter-governmental relations and postwar problems, Gov. Earl Warren of California said that action to secure a declaration of government policy on war plant disposal was one of the most important topics to be taken up by a proposed interstate board to deal with reconversion problems.

"The West Coast has a lot of new industry which mushroomed into existence with the war," the governor said. "Much of it is financed by the government and the government controls its future. A great deal of our future depends on the government's policy in disposing of industrial facilities."

Allis-Chalmers War Production Role Detailed

Walter Geist, president, points out company's extensive participation in war effort. Output covers wide range

EXTENSIVE participation of the Allis-Chalmers Mfg. Co., Milwaukee, in the war production program was partially revealed by Walter Geist, president, last week. The list of items produced by the company ranges from tiny electric control equipment for Navy vessels to the 38-ton M-6 military tractor used for pulling large 240-mm howitzers.

In achieving this record production, said Mr. Geist, manufacturing demands were much different from easy-going peacetime experience. Plant capacity was pushed to bursting point, old machines, irreplaceable in wartime, had to be nursed along. Raw material shortages were frequent and stepped-up schedules were regular. Sudden changes in design due to varying battlefront conditions were encountered.

Among products turned out by Allis-Chalmers is the M-4 high-speed tractor used in pulling 90-mm and smaller anti-aircraft and other guns. This is an 18-ton vehicle. Also produced are the M-7 snow tractors and M-19 snow sleds. M-1 is the designation for the company's large crawler-type industrial tractors which were redesigned and modified at Army request.

Three other diesel tractor types—of 60, 96 and 132 horsepower—have powered bulldozers and pulled scrapers used by the Seabees and Army engineers.

Aided Aircraft Program

Mr. Geist said his company last year started production of jet propulsion aircraft units. Until a few weeks ago it had been manufacturing turbo-superchargers for B-29 and B-17 bombers and some fighter planes. Also it turned out since late in 1943 gear-driven superchargers for use with Merlin Rolls Royce aircraft engines.

An important contribution of the company to sea warfare includes main propulsion turbo-generator units. It also designed and completed 1300 diesel-driven fire pumps for LST vessels and approximately 12,000 pumps for the firing mechanism of the Bofors 40-mm anti-aircraft guns used on ships. Other Navy equipment includes submarine bulkhead doors, waterproof submersible pumping units with electric motors, diesel-driven generators for shipboard use and more than 22,000 inverters for communication and gunnery operations. In addition, there were winch cases and winch case motors, marine steam condensers and shaftings and forgings, all for Navy and Maritime Commission ships.

Mr. Geist also said Allis-Chalmers has been very active in the development, design and production of many items needed for completion of the radar program. Modulators, transformers, receivers, electronic log equipment, chronometric tachometers and communications equipment were supplied by the company.

It also participated in the shell and artillery program and produced auxiliary equipment for trucks, such as snatch blocks used in extricating equipment from mud. Gas turbine-driven axial compressor units were built for use in the Houdry process of refining high octane aviation gasoline. Diesel engine starting motors were also turned out for the war effort. Equipment also was built for the synthetic rubber program.

According to Mr. Geist the list is far from complete, there being many military items which it produces still on "classified" contracts, the nature of which cannot be divulged now because of military security.

To facilitate reconversion of industry, Allis-Chalmers will soon begin to distribute a newly prepared inventory kit covering centrifugal pumps, V-belt drives, and electric motors. The kit will enable the user to determine the exact condition of each piece of existing equipment which is scheduled for peacetime production duty.

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

B. F. Goodrich Co.'s Army Training School, Akron, has completed its assignment after training more than 900 officers and men in the care and maintenance of tires, tracks, and vehicle undercarriages since Jan. 5, 1942.

—o—

Westinghouse Electric Corp. is conducting at its East Pittsburgh, Pa., plant an intensive study and training course for members of the Army Engineers Corp who will install, operate, and maintain electrical power equipment in Pacific war areas.

—o—

Edward G. Budd Mfg. Co., Philadelphia, will build, as soon as materials and manpower are available, 59 stainless steel railroad passenger coaches for use between New York and Miami, Fla.

—o—

Keller Tool Co., Grand Haven, Mich., has appointed Dawson Machinery Co., Seattle, as a distributor of pneumatic tools.

—o—

Continental Can Co.'s district sales office at Philadelphia is now located at 12 South Twelfth street.

—o—

National Bureau of Standards, Washington, announced that a simplified practice recommendation for cast brass solder-joint fittings became effective July 1. It is identified as R212-45.

—o—

General Electric Co.'s works at Erie, Pa., is completing first production units of a new type diesel-electric locomotive suitable for heavy yard duty and road service. The new locomotive will be rated 600 hp, weigh 70 tons, and have a top speed of 55 mph.

—o—

Western Maryland Railway has put into service on its transfer bridge in the

Todd Steel's New Warehouse Operating

EDWIN S. WEINER

EXPANSION of its services to manufacturing industry through new and enlarged steel warehouse facilities recently was announced by the Todd Steel Corp., Detroit. The company has just completed erection of a new warehouse, which, Edwin S. Weiner, president, states has 15,000 square feet entirely devoted to the shearing and handling of sheet steel.

According to Mr. Weiner, the urgency of his company's contract work for Army Ordnance, to a great extent, aided the company in obtaining permission from the War Production Board to build the new plant at the very time of the German break-through in the Ardennes, last December. The new building is modern in every respect and was erected by the O. W. Burke Co., with Andrew Morrison, architect, and Paul S. Calkins, designing engineer.

Baltimore harbor two wrought iron pontoons because of corrosiveness of the salt water.

—o—

Folmer Graflex Corp., Rochester, N. Y., is now known as Graflex Inc.

—o—

Kelite Products Inc., manufacturer of industrial chemicals for cleaning and processing, has moved its southwestern headquarters from Houston, Tex., to Dallas, Tex.

—o—

American Brake Shoe Co.'s Kellogg Division plant and Southern Wheel Division plant, both at Rochester, N. Y., have received certificates of safety achievement from the U. S. Department of Labor. The two plants reduced their accident frequency rates more than 40 per cent in the last half of 1944.

—o—

Standard Oil Co. (Indiana) shipped from its Whiting, Ind., and Wood River, Ill., refineries almost 2700 tons of heavy melting iron and steel scrap to steel mills for re-use in the war production program, in the six-month period ending March 31, 1945.

—o—

Carnegie-Illinois Steel Corp., Pittsburgh, has issued an illustrated booklet *You and Carnegie-Illinois* to provide its employes with general information on company practices.

—o—

Borg-Warner Corp., Chicago, and subsidiaries, subscribing $7,100,000 to the Seventh War Loan drive, have increased to more than $45 million the corporation's participation in all the war loan campaigns.

—o—

Commonwealth Engineering Corp., Dayton, O., has acquired from Chadeloid Chemical Co., New York, 50 patents dealing with wood stains, opalescent lacquers and varnish removers, and has formed the Chadeloid Corp., Dayton, which will provide complete technical services to industrial finishers.

Wickwire's Picture Auction Sells $285,000 in War Bonds

Auction of originals of 29 pictures used in institutional advertising by Wickwire Spencer Steel Co., New York, effected the sale of $285,000 in war bonds in New York recently.

The pictures were the originals of the "Axis in Agony" series created by Boris Artzybasheff, artist.

Highlight of the sale was the auctioning of the picture formerly called "Wire to the Axis," and renamed "Victory in Europe," for the purpose of having the winning bidder present it to General Dwight D. Eisenhower. The picture brought about the sale of $25,000 in war bonds and has been sent to the general at his home in Abilene, Kans. It was purchased by Charles Grace, Kleghorn Corp., New York.

TO MOSCOW: These officials of Timken Roller Bearing Co., Canton, O., are on a mission to Russia to interest the government in use of Timken tapered roller bearings on railways and to offer technical aid in plans for a roller bearing plant. They are William E. Umstattd, seated, president; A. L. Bergstrom, left, vice president in charge of engineering; and O. J. Horger, chief engineer of Timken's railway division

Lukens Steel Co. Observes 135th Year of Production

Lukens Steel Co., Coatesville, Pa., is observing on July 2 the 135th anniversary of the city of Coatesville and the 135th anniversary of the continuous making of iron and steel at Coatesville by Lukens under an uninterrupted family ownership and management.

The company operates a 206-inch mill, largest plate rolling mill in the world. The company's facilities cover about 400 acres, and it employs approximately 5000 people, including its two subsidiaries, By-Products Steel Corp., and Lukenweld Inc.

Three descendants of the family that founded Lukens are active today in the company's management. Serving as directors, they are: Charles Lukens Huston first vice president; Stewart Huston, secretary; and Charles Lukens Huston Jr., president of Lukenweld Inc.

AWARDS . . .

Excellence in the manufacture of war materials has brought the Army-Navy "E" award to the following:

American Blower Corp., Detroit and Dearborn, Mich., plants.

Atwood Vacuum Machine Co., Rockford plant, Rockford, Ill.

Babcock & Wilcox Co., Bayonne, N. J., plant.

Bendix Aviation Corp., Eclipse-Pioneer Division, Teterboro, N. J.

Bulova Watch Co., Fuse Division, Philadelphia.

Harry Darby, Manufacturer, Kansas City, Kans.

Davenport Besler Corp., Davenport Locomotive Works, Davenport, Iowa.

E. I. du Pont de Nemours & Co. Inc., Wilmington shops, Wilmington, Del.

Farrel-Birmingham Co., Ansonia and Derby, Conn., and Buffalo plants.

General Armature Corp., Lock Haven, Pa.

General Aviation Equipment Co., Metallic Link Division, Waller street plant, Wilkes-Barre, Pa.

Howell Co., St. Charles, Ill.

Kerrigan Iron Works Inc., Northside plant, Nashville, Tenn.

Lake Erie Engineering Corp., Kenmore, N. Y.

Lavelle Aircraft Corp., Newton, Pa.

Massillon Aluminum Co., Massillon, O.

McKay Co., McKees Rocks, Pa., plant.

Morgan Construction Co., Worcester, Mass.

National Roll & Foundry Co., Avonmore, Pa.

Noblitt-Sparks Industries Inc., Orinoco Division, Columbus, Ind.

Pennsylvania Tool & Mfg. Co., York, Pa.

Pitt Engineering Co., Chicago.

Proctor & Schwartz, Electrical Division, Philadelphia.

Scott & Fetzer Co., Cleveland.

Torrington Co., Bantam Bearings Division, South Bend, Ind.

Truscon Steel Co., Youngstown plant, Youngstown.

United States Radiator Corp., West Newton plant, West Newton, Pa.

Verson Allsteel Press Co., Chicago.

Vita-Var Corp., Newark, N. J.

Warren Co. Inc., Atlanta.

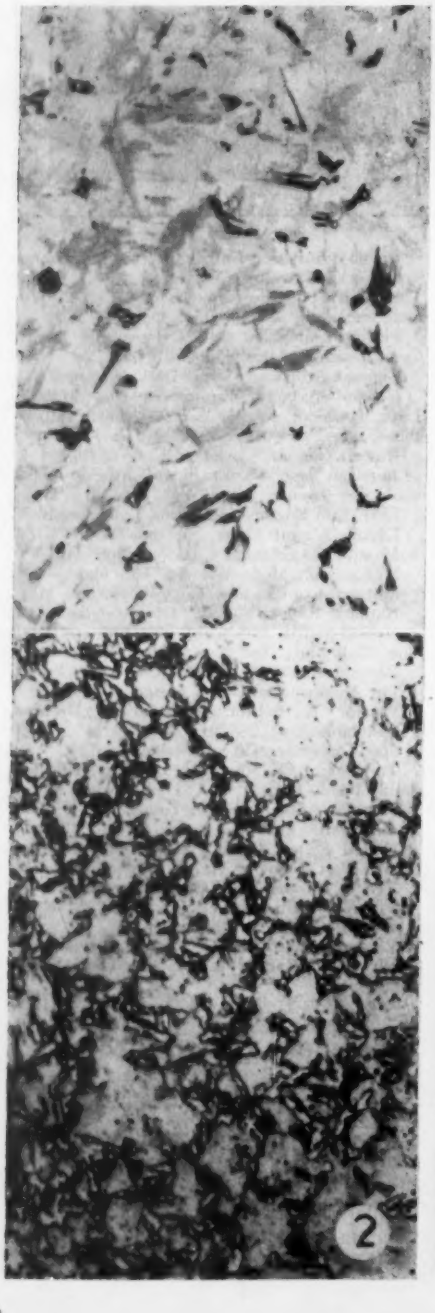
White Sewing Machine Corp., Cleveland.

Wycombe Garage & Machine Shop, Wycombe, Pa.

Machinery Exports from Canada Increase over 1944

Exports of farm machinery from Canada during the first four months of this year were valued at $5,832,000 compared with $4,626,000 in the corresponding period of 1944, according to the Department of Commerce.

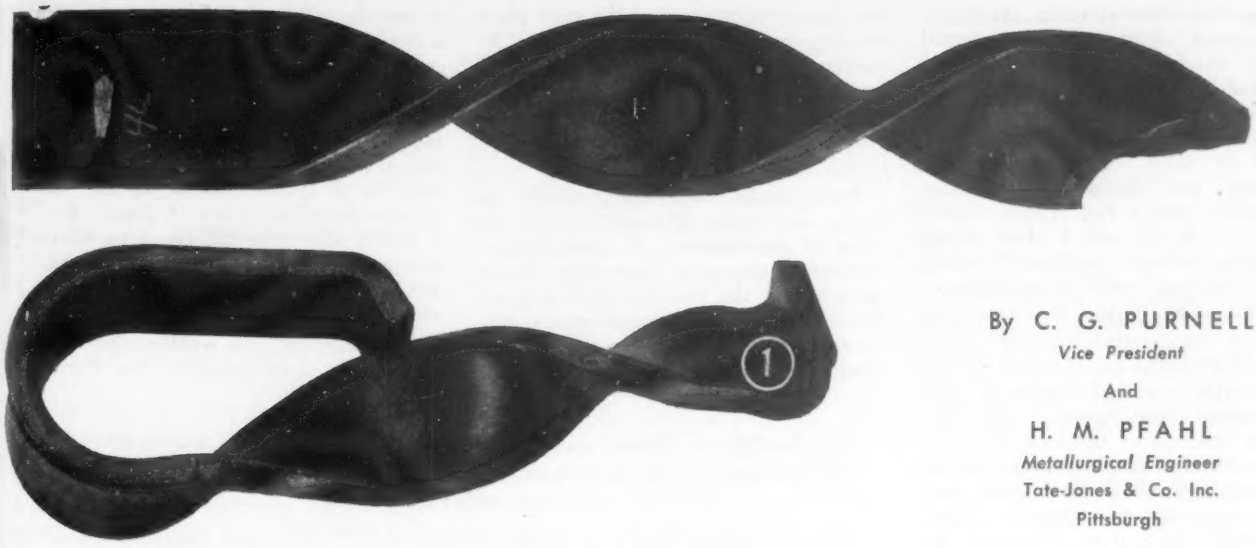
Improved QUE



HEAT treating, long somewhat of an art, has become more and more standardized, especially with the rapid developments in the last 15 years in our knowledge of what actually occurs when the various transformations take place in a piece of steel. Definite improvements have been made in furnace construction.

While laboratory quenching has attained a high degree of efficiency, the same can not be said in all cases for commercial production methods. A heat-treating cycle can be likened to a chain in which all links must do their work properly or the desired results will not be obtained. The Purnell system (Covered by U S. Patent 2,322,777 assigned to the Carnegie-Illinois Steel Corp.) represents a step further toward perfection in which control of the quenching phase of the heat-treating operation is exercised to a much higher degree than formerly with an attendant improvement in uniformity of product. Fig. 1 illustrates several parts which have been heat treated by the Purnell process, obtaining maximum hardness and toughness.

Let us consider for a moment just what is desired in a heat-treated steel part. As we all know, certain qualities are obtained at the expense of others, and our only recourse is to try for the best combination of all properties desired. The first group includes physical properties, principally hardness and toughness. Minimum distortion or warpage is also essential. It is appreciated that a large amount of undesirable warpage can be caused by poor heating, and this will not be cured later



By C. G. PURNELL
Vice President
And
H. M. PFAHL
Metallurgical Engineer
Tate-Jones & Co. Inc.
Pittsburgh

CHING

. . . . produces parts with higher tensile and yield strengths as well as materially increased toughness. Purnell process features strongly agitated quench bath; increased speed of quenching action; precisely timed quench, producing exact end temperature; immediate tempering. Distortion is controlled; machinability increased

except by straightening. However, poor quenching procedure can also contribute to this undesirable condition.

A third quality, closely allied with warpage, is cracking—obviously it is always desired to reduce this to the absolute minimum. Fourth, we have machinability which can be substantially affected by microstructure which in turn is controlled to a large extent by the heat treatment. Many parts such as shells, gun barrels, airplane and automobile engine parts, wrenches, pliers, and cutting pliers are now being partially or completely machined after heat treatment. This has focused attention on the effect of heat treatment on machinability.

The fifth property, which could be considered to include all those just mentioned, is uniformity. It is of the utmost importance when heat treating quantities of articles to have them finish as nearly identical as possible. This uniformity must be thought of in two ways, that is, (1) uniformity throughout any one piece and (2) uniformity from one piece to the next. This uniformity is of extreme advantage in subsequent manufacturing because it permits better standardization of operations with a consequent saving in costs.

The heat-treating process described here provides improved quality and uniformity which in turn means less rejections and less retreatment. It is not the purpose here to go into the effects of decarburization, scaling, and any other features which are functions of heating only. Only those qualities which will be affected by the quenching operation are to be discussed.

There are four basic features which go to make up the Purnell process. All are equally important and, to get proper results, care should be taken that all four features are utilized to the fullest degree. First is the uniformity of the quench which is quite important as it determines the uniformity of microstructure throughout the quenched work. This uniformity is obtained by the use of propeller agitators which are very carefully positioned and powered. Second and allied with this is increased speed in quenching which assures better microstructure by either the reduction or elimination of pro-eutectoid ferrite and high temperature transformation products. The third feature is accurate timing of the quench. The time the work is in the quench bath is precisely regulated and, once set for a specific article, is adhered to closely. This time may be long enough to form a certain amount of martensite or only long enough to form bainite.

The fourth point is the immediate tempering. The quenched work is tempered as soon as possible, without allowing it to cool any more than is absolutely necessary. This helps produce greater toughness and less warpage or

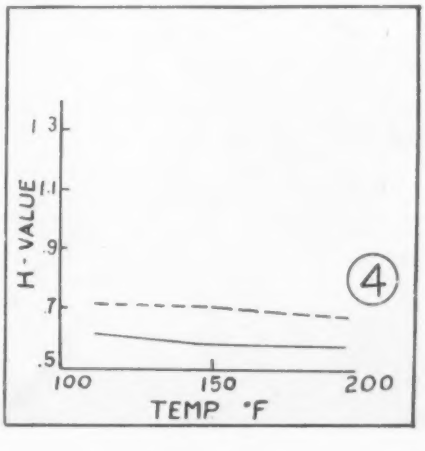


Fig. 1—Although these Purnell processed parts have higher tensile and yield points than usual, they still possess amazing toughness as evidenced here

Fig. 2—SAE 2340 airplane engine rocker arms: A—Purnell method, 512 brinell as quenched; B—quench and tempered, 387 brinell as quenched. X1000

Fig. 3—On 0.65 carbon Amola steel, 0.66-in. round: A— Purnell method, quenched at 1500°F, tempered at 250°F, 61-62 rockwell C; B—conventional method, with same quench and tempering temperatures, 55-60 rockwell C

Fig. 4—Curves showing effect of agitation on H-value of a typical commercial quenching oil: Dotted line, Purnell quench; solid line, "hand" agitation

cracking, and eliminates any possibility of developing minute incipient internal ruptures which may encourage subsequent failure of the part.

Effect of Hardness: Due to the higher quenching rate and more complete removal of scale, higher as-quenched hardnesses are obtained with many steels which have a fast critical cooling rate. Figs. 2, 3, and 4 show actual comparisons between the Purnell method and conventional "still" oil quenches.

Effect on Physicals: For the same tempering temperature, higher tensile and yield strengths are obtained as well as materially increased toughness. Figs. 1-6 illustrate these points clearly. Note that the hardness of the lock washer is 52 rockwell C (SAE-9260 steel), the rail anchor 45 rockwell C (SAE 1095 steel), and the wrenches 45 rockwell C (SAE-1080 steel). Also, it is of interest that this toughness is obtained on larger as well as small sizes as evidenced by the various size wrenches.

Effect on Machinability: Heat-treated material is not always machined but the practice of machining, especially finish machining, after heat treating is growing. It is being realized more and more that the microstructure of the steel plays an important part in determining its machinability. Although two pieces of the same steel may be quenched and tempered to identical hardnesses, their machining properties can be quite different.

Pro-eutectoid steels are probably the group most highly affected this way because of the tendency of ferrite to precipitate in the grain boundaries during quenching if the cooling rate is not sufficiently rapid. The Purnell process produces material with better than normal machinability because of the increase in quenching rate and also, a point which is very important, because this increased cooling rate is gained on all sides of the piece of steel being quenched.

In shell manufacture this is highly important since shells are finish machined all over after heat treatment and tool life is a major factor in the economical operation of a shell plant. Figs. 5 and 6 show the difference in microstructure between shells of WD SS3 steel which exhibited good machinability and those which did not.

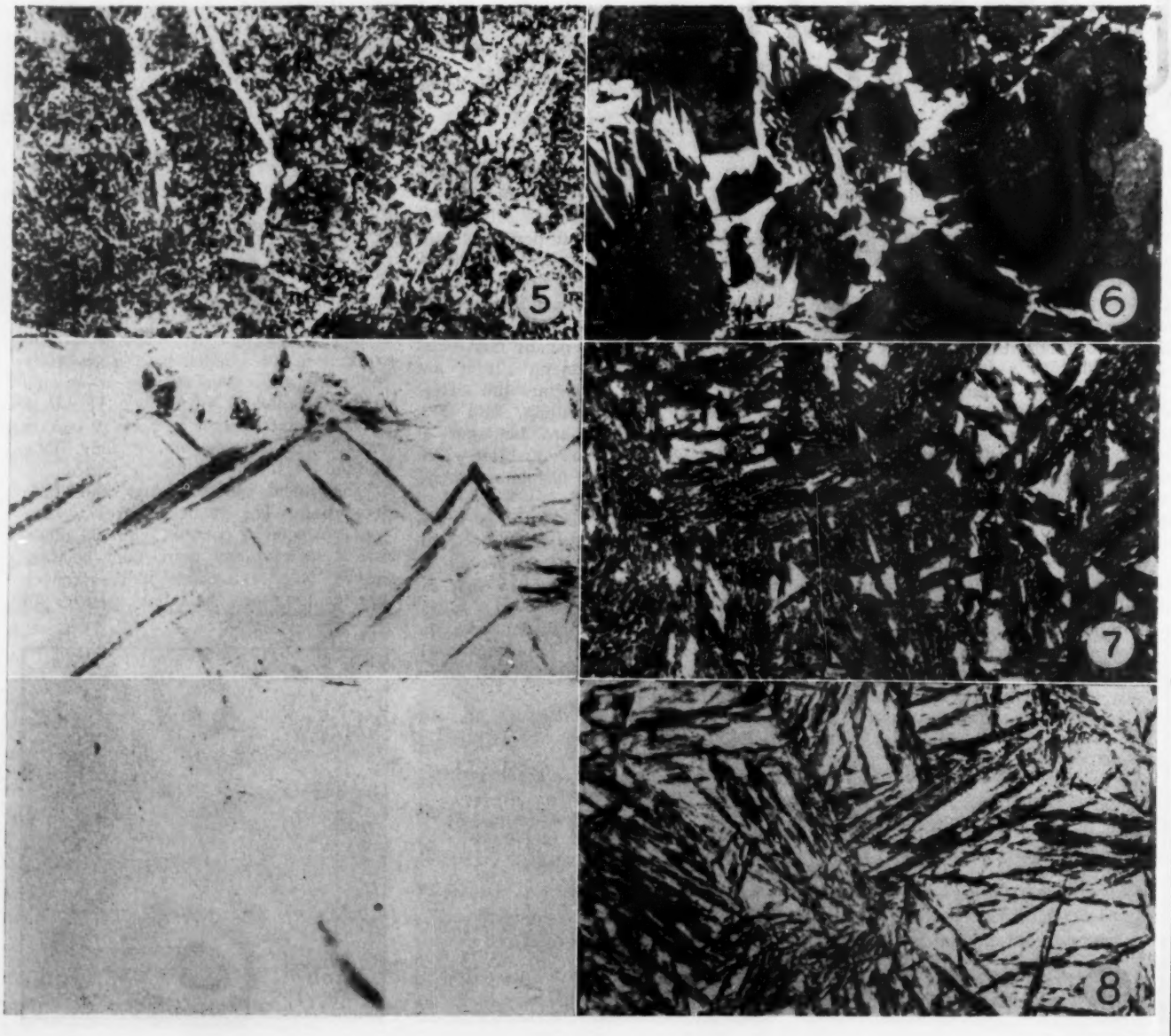
One company, in a written report, has stated that since adopting the Purnell

Fig. 5—Effect of Purnell quench on machinability of WD SS3 steel in 90-mm shell is shown by this good machinable structure. Note reduction of free ferrite. Compare with Fig. 6. X1000

Fig. 6—Conventional quench and temper of WD SS3 steel. Compare with Fig. 5. X1000

Fig. 7—Purnell treated 1/4-in. rounds 0.74 carbon steel: A—quenched 2½ sec., tempered 120 sec. at 500°F—15-18% transformed; B—same as A but tempered 720 sec.—95% transformed. Compare with Fig. 8. X1000

Fig. 8—Same steel as Fig. 7 but austempered: A—Isothermally transformed at 500°F for 120 sec., 1-2% transformed; B—same but for 720 sec., 60% transformed. X1000



process they are obtaining tool life within 5 per cent of that obtained using the old unheat-treated WD X-1345 steel which of course contained high sulphur to aid machinability. The same improvement has been experienced with gun barrels of WD 1350 special steel which are drilled and rifled after heat treatment, and also with various airplane engine parts.

It must be emphasized that less soft spots and less warpage also aid in prolonging tool life and give smoother machining. It is the opinion of many people that one of the chief causes of machinability troubles is non-uniformity in the steel. From this standpoint the Purnell process is quite beneficial since it provides a more uniform quench which in turn produces a heat-treated part having a more homogeneous structure.

Effect on Warping and Cracking: Warping and cracking are both caused by stresses set up in the steel which either cause bending or exceed the tensile strength of the steel and cause cracking. These stresses are caused by thermal expansion and contraction and by the size change that accompanies the phase transformations in the steel. These conditions can be promoted by poor heating, poor design, and poor quenching and tempering. We will not touch on the first two causes.

The Purnell process is extremely effective in reducing or eliminating the last two causes. Three out of the four basic points mentioned earlier are essential factors. First the greater uniformity of cooling on all sides of the quenched article tends to prevent one section from reaching a temperature far different from another and also from transforming too rapidly while some other portion is either still hot or already transformed. Naturally, on pieces having radical changes in section, this condition cannot be completely eliminated. Second, the accurate timing of the quenching period prevents the work from being quenched "dead" cold and thus discourages the setting up of severe internal stresses. Third, by immediately tempering, the aforementioned stresses get little chance to manifest themselves, and those which have been set up are almost immediately relieved.

Bearing races of SAE-52100 steel 14 in. in diam up to 27 in. in diam have been treated by this method to a hardness of R_c 63 and less warpage has been reported than obtained by quenching in special quenching machines. Also, fuze bodies of WD 4150 steel and gun barrels of WD 1350 special steel have been treated with practically no warpage in the first case and no straightening required in the second. As a matter of interest, it has been found that if 8-in. H.E. shells are quenched dead cold in a Purnell tank and held out in the air for 20 min before tempering, the noses may pull out of line as much as ⅜-in. while, if they are quenched for 5 min and tempered immediately, no warpage results.

Micrographic examination has shown that quenching by this method, when the quench is timed so that no martensite forms, produces a structure identical with that obtained upon isothermal transformation. However, as shown by the micrographs, Figs. 7 and 8, the transformation takes place faster than when direct isothermal transformation is employed. In addition, larger sizes can be successfully heat treated by this method to obtain this type of structure than can be heat treated isothermally. Examination of the "S" curves for various grades of steel clearly shows how this method of heat treatment can be applied to form martensite if desired, or to form straight bainite (see Fig. 9).

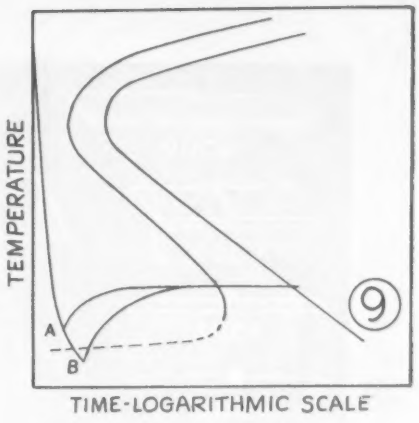


Fig. 9—S-curves showing how at A quench is timed to form bainite; at B quench has been timed to form martensite

These micrographs do not show the wide application of this method of heat treating. It has been successfully applied to parts ranging in size from small gun trigger mechanisms to large gun tubes, armor plate, shells, and many miscellaneous parts of all shapes, sizes, and grades of steel. It is definitely a production method of heat treating; in fact, its superiority over conventional quench-and-temper methods is most apparent after examination of the results of heat treating a large number of parts.

Because of the high degree of control exercised throughout the operation, the maximum uniformity of product is

(*Please turn to Page* 127)

PHYSICAL PROPERTIES OBTAINED BY PURNELL PROCESS

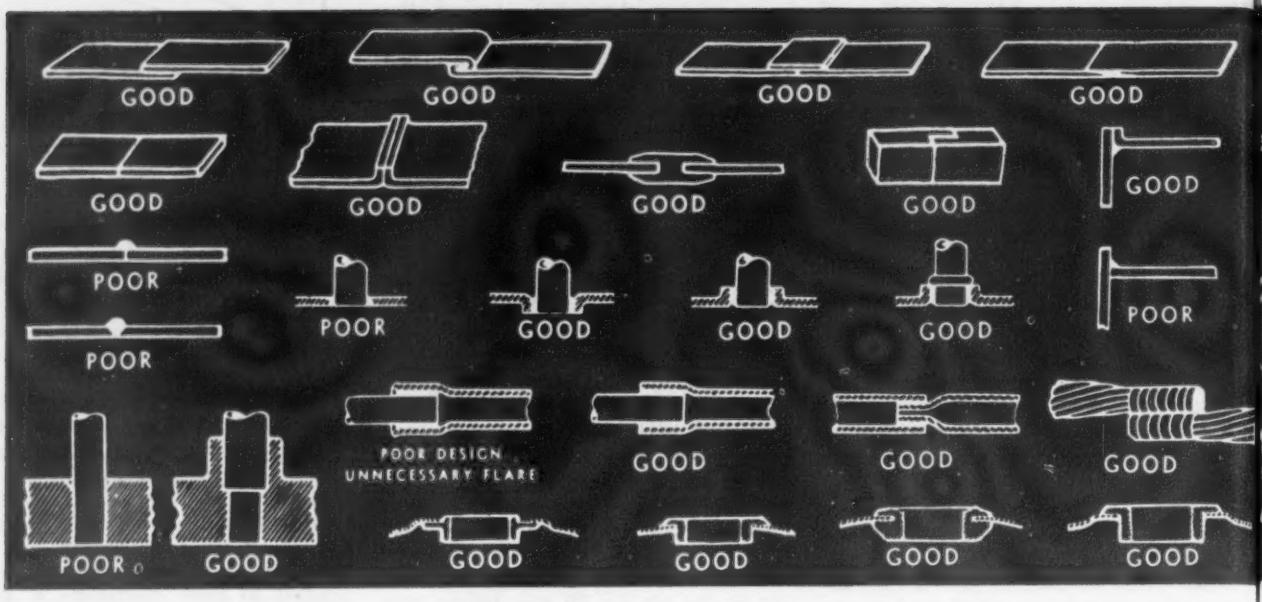
(P = Purnell Treatment) (C = Conventional Quench and Temper)

Part	Heat Treatment Quench	Heat Treatment Temper °F.	Steel Grade	Hardness	Y.S. psi	T.S. psi	El. 2" Per Cent	Red. Area Per Cent
75 mm. shell	P 1600	1150	WDSS-3	241 BHN	81,400	119,000	25.7	59.5
75 mm. shell	C 1600	1150	WDSS-3	241 BHN	74,700	113,700	25.0	61.5
¾" rd. bar	P 1520	800	SAE 3135	36-38 R_c	163,000	175,000	13.0	49.8
¾" rd. bar	C	....	SAE 3135	34-36 R_c	147,000	160,000	14.0	51.9
Bar	P 1550	1000	SAE 3140	....	123,000	140,000	20.0	61.3
Bar	C 1550	1000	SAE 3140	....	105,000	134,000	19.0	60.8
Bar	P 1550	1000	SAE 3140	....	129,000	149,400	19.0	59.8
Bar	C 1550	1000	SAE 3140	....	125,000	151,500	17.5	58.6

					Bend Tests: Max. Load	Bend Tests: Angle of Bend Before Break
Tractor plates	P 1550	1000	SAE 3140	269-285 BHN	3100 lb.	151°40"
Tractor plates	P 1550	1000	SAE 3140	269-302 BHN	3400 lb.	138°45"
Tractor plates	P 1550	1100	SAE 3140	255-269 BHN	3150 lb.	149°30"
Tractor plates	P 1550	1100	SAE 3140	255-277 BHN	3250 lb.	173°20"
Tractor plates	C	....	SAE 3140	241-255 BHN	2750 lb.	133°30"

				Rockwell "C" 1.	2.	3.	Izod. Impact—Ft. Lbs. 1.	2.	3.
½" sq. bars	P 1525‡	212	SAE 4140	56.7	56.5	56.3	2	2	2
½" sq. bars	C 1525‡	212	SAE 4140	55.6	56.5	57.6	5	1.5	2
½" sq. bars	P 1525*	450	SAE 4140	47.7	46.8	46.0	18.5	19.5	18.5
½" sq. bars	P 1525†	450	SAE 4140	51.6	52.7	49.5	14	15.5	18
½" sq. bars	P 1525‡	450	SAE 4140	52.6	51.8	50.8	16	16	16
½" sq. bars	C 1525‡	450	SAE 4140	51.5	52.7	52.0	11	8.5	12
½" sq. bars	P 1525*	1000	SAE 4140	38.7	38.5	39.3	30.5	31	30
½" sq. bars	P 1525†	1000	SAE 4140	39.2	40.5	39.9	29	28.5	25
½" sq. bars	P 1525‡	1000	SAE 4140	39.7	39.9	40.5	25	25	25
½" sq. bars	C 1525‡	1000	SAE 4140	38.4	38.2	37.9	26	28	29

*Quench Time—5 seconds. †Quench Time—7 seconds. ‡Quench Time—10 seconds



BRAZING with electric induction heat

An authority describes in detail how to join parts with silver-base alloys

By A. M. SETAPEN
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Handy & Harman
New York

IN THE PAST decade, the use of silver brazing alloys has increased many fold. Concurrent with this tremendous increase in brazing has been a decided trend toward high speed production methods of heating. Prominent among the various methods of automatic heating has been the use of electric induction. It is the purpose here to describe method of heating for silver alloy brazing.

Silver alloy brazing is a process of joining metals with heat using a filler rod or brazing alloy containing silver. The alloy has a melting point above 1000° F but below that of the metals or alloys being joined. Silver brazing alloys contain amounts of silver varying from 5 to 80 per cent.

Generally speaking, the old type standard silver brazing alloy is a brass composition to which varying amounts of silver have been added. There are about 14 different compositions (see accompanying table) of these standard alloys with flow points varying from 1300 to 1600° F as compared to the flow points of from 1600 to 1980° F for base metal brazing materials. Besides these 14 alloys there have been developed two additional silver brazing alloys which have the lowest flow points of any alloy available. The use of these alloys (last two in table) has increased tremendously in the past few years and these are the ones most widely used in conjunction with induction heating.

One of these, an alloy of silver, copper and phosphorus having a flow point of 1300° F is suitable for joining copper and copper base alloys, but should not be used for joining iron and steel because of the formation of a brittle iron phosphide at the interface. This alloy is self-fluxing to a great degree, and when used for joining copper it is not necessary to employ a flux. Its use has increased extensively in recent years for the joining of copper and brass pipes and fittings in the marine and electrical fields for making varied types of copper joints. Where localized heating is necessary to prevent excessive annealing of copper leads, induction heating is employed with this alloy to considerable advantage.

The other low melting point alloy contains silver, copper, cadmium and zinc. Its low flow point of 1175° F combined with the high strength of joints which can be obtained with both ferrous and nonferrous alloys makes it suitable for a wide variety and large number of applications. It is exceptionally fluid and particularly adapted to high speed heating such as induction, which can take full advantage of this free-flowing property.

Table lists the composition and physical properties of many of the siver brazing alloys finding present day uses.

Alloy No. 1: Low-grade silver alloy used for joining iron and steel and any nonferrous metals which will withstand the 1600° F flow point. Particularly suited for joining metal parts to be subsequently heat-treated.

Alloy No. 2: Flow point allows use with extruded brass. The alloy flows freely at temperatures above 1500° F and makes strong joints with copper, copper base alloys, nickel, silver, steel and iron.

Alloy No. 3: The increase of silver to 30 per cent brings the flow point of this alloy down to 1410° F. It can be used with the same metals as alloys 1 and 2, with the advantage of having less tendency to injure metal parts from overheating.

Alloys Nos. 4, 5 and 6: Silver is in excess of either copper or zinc and the alloys are nearly white in color. These alloys and others, varying slightly in composition, are the typical silver brazing alloys which have been used for many years. They can be used with steel, iron, copper, copper base alloys and nickel silver. They are malleable and ductile, flow freely, have good corrosion resistance and the strong joints made with them resist severe shocks and vibration.

Alloy No. 6: This alloy which contains only 16 per cent zinc is one of the most popular grades and both this alloy

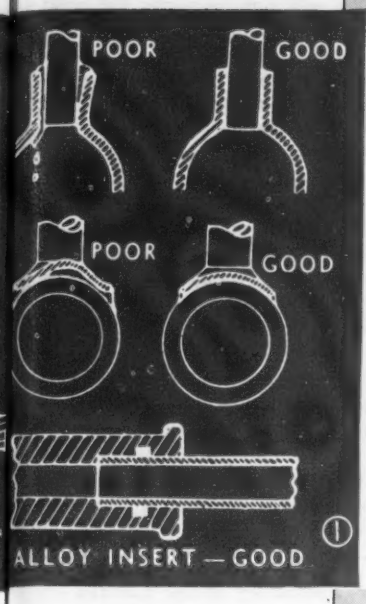


Fig 1—Good joint design for silver brazing requires closely fitted joints with some overlap of parts as shown here

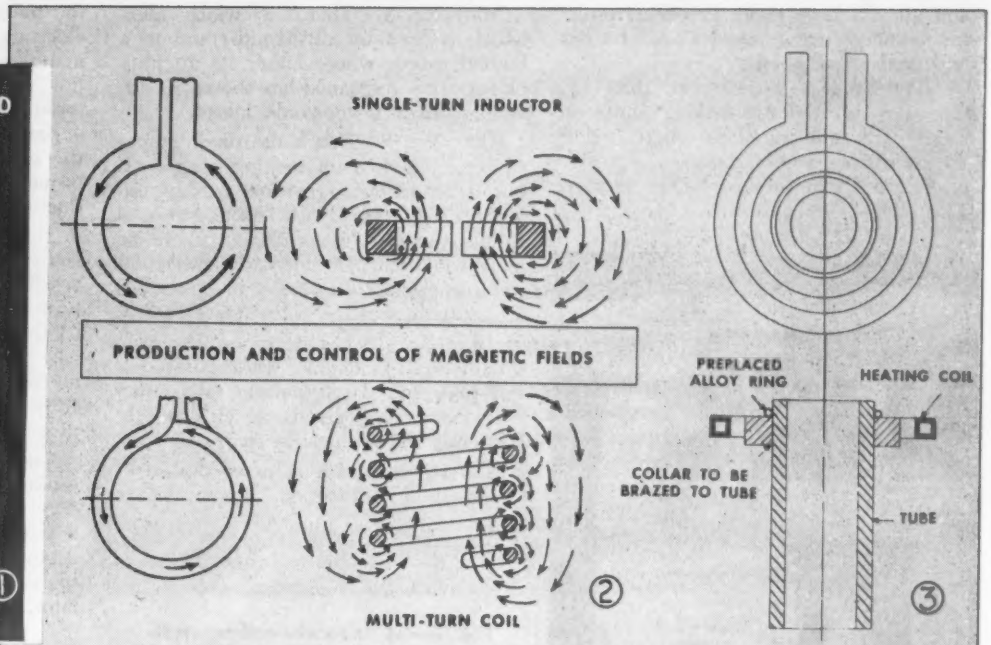


Fig. 2—Production and control of magnetic fields with single and multiturn coils. Note concentration of the field within the coils

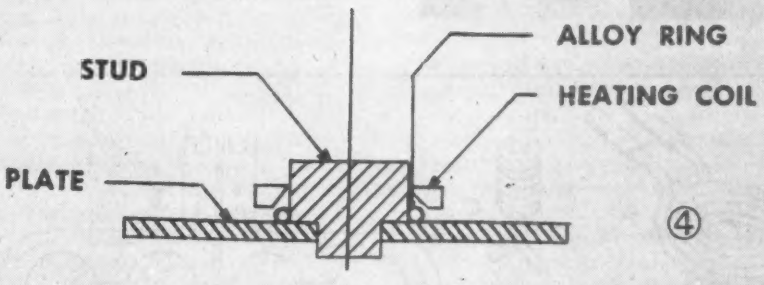


Fig. 3—Single-turn coil for heating collars, flanges, etc. for joining to tubular members where outside member is heated by induction, inside member by conduction

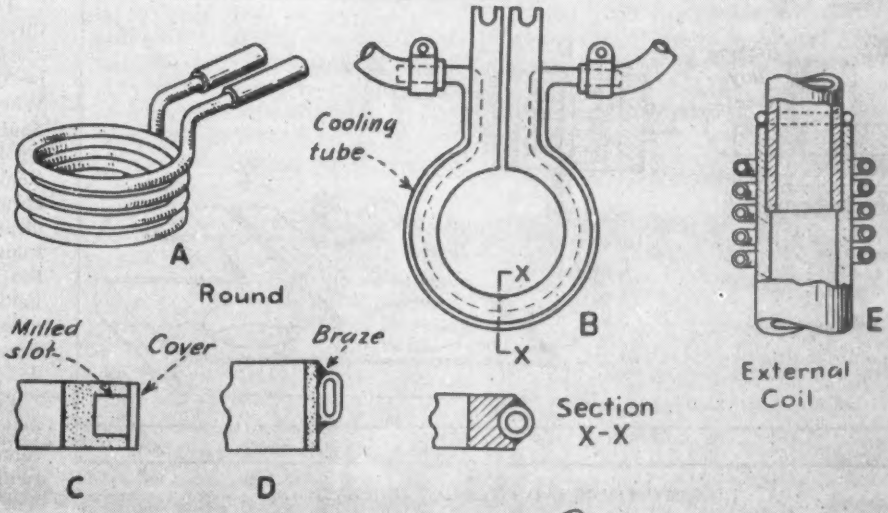
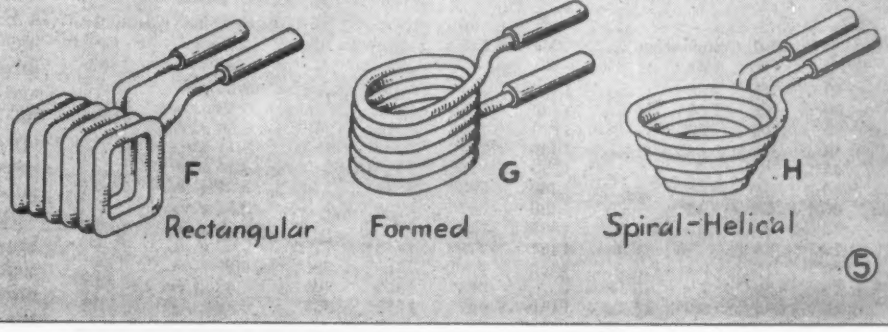


Fig. 4—Single-turn coil for heating to join studs to plates where both members are heated simultaneously

Fig. 5—Various types of coils; "A" round multiturn; "B" single inductor with various cooling means shown at "C", "D" and section x-x; "E" external coil for heating tubular members; "F", "G", and "H" are rectangular, formed, spiral-helical coils for specially shaped parts



and alloy 5 have given excellent results for joining many grades of ferrous and nonferrous metals.

Alloy No. 7: Flowing at 1325° F, this alloy is used for making joints on small parts and on alloys where higher temperatures would cause excessive grain growth or produce other undesirable effects.

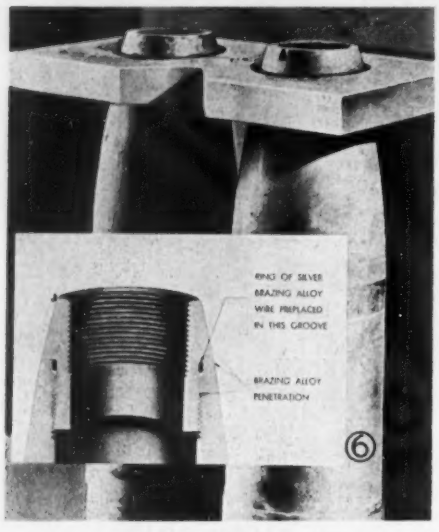


Fig. 6—Silver brazing nose adapter to body of chemical shell

Alloy No. 8: This is a "white" alloy which is used by silversmiths and to a limited extent where either its ductility or corrosion resistance has shown its advantage over lower-grade alloys.

Alloy No. 9: This is the silver-copper eutectic and has no melting range. It has a tendency to oxidize readily unless well protected with flux and is used to resist corrosive conditions where an alloy containing zinc or cadmium is not suitable. It is often used in controlled atmosphere furnaces without use of flux.

Alloy No. 10: This is an extremely ductile and malleable white alloy. It has been found particularly satisfactory for joining copper rods which are subsequently drawn into fine wire.

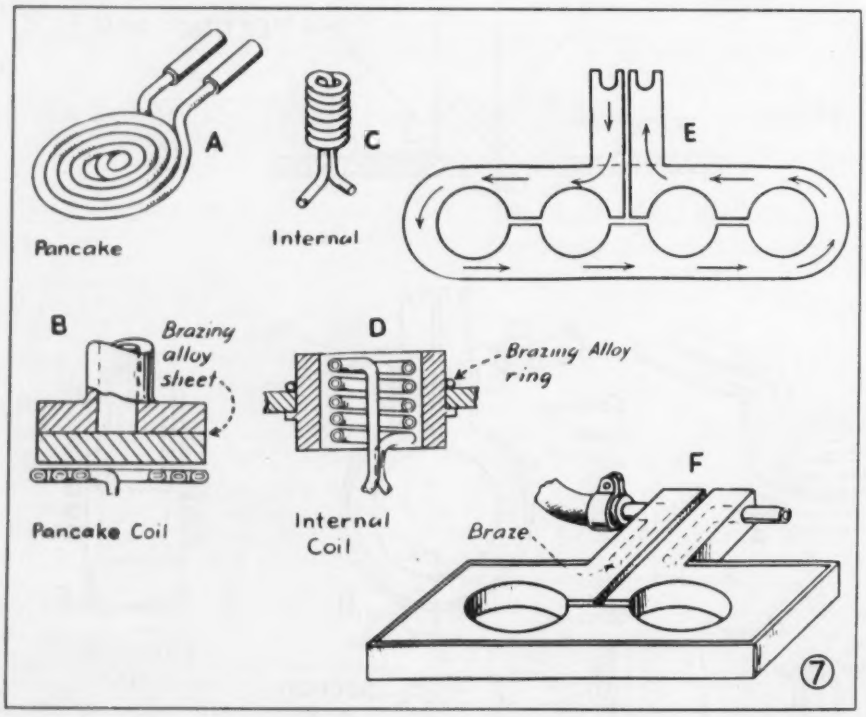
Alloys Nos. 11-12: Discussed above.

Induction heating is the raising of the temperature of any material by the electric generation of heat within the material and not primarily by conduction, convection or radiation. The material being heated does not make up a part of a closed electric circuit as is the case with resistance heating, but is merely placed near or within the induction coil.

The temperature rise of the material is by virtue of the eddy current losses resulting from electric resistance and hysteresis losses which are analogous to friction losses dissipated in the form of heat. Nonmagnetic materials are subject to eddy current losses alone while both eddy current and hysteresis losses serve to heat magnetic materials.

There are three general methods of producing high frequency electric energy for induction brazing and all three have been successfully used; namely, the rotating electric generator, the resonant spark gap and the vacuum tube oscillator.

Fig. 7—"A" pancake coil for heating flat surfaces as at "B"; "C" internal for heating inside surfaces as at "D"; "E" current path in multiposition inductor at "F"



Frequency Range Limited

The rotating electric generator while limited in its frequency range to about 10,000 cycles per second by mechanical design, is available at capacities ranging up to 700 kw at 9600 cycles and 1250 kw output at 3000 cycles. The resonant spark gap circuit has a normal range of frequency limits between 80,000 and 200,000 cycles per second, and is limited in capacity to about 30 kw. The vacuum tube oscillator's normal range of frequency is between 200,000 to a few million cycles per second, but it, too, is limited in output capacity to about 30 kw, although higher output vacuum tubes are coming on the market ranging up to 100 kw per tube.

There are three principal types of joints used in silver brazing, namely, butt, scarf and lap or shear, and each can be used with flat or tubular members. Where it is objectionable to have the double thickness of metal, such as in lap joints, the butt or scarf joint is used. Remarkably high strength can be obtained with these joints provided proper clearances are maintained but they are somewhat more difficult to handle than the lap joints. The scarf joint is a modified butt joint which permits a greater area of joint for the same thickness of metal. Good and also poorly designed joints are shown in Fig. 1.

Lap or shear type joints are more widely used in silver brazing, and with tubular or round members they are particularly adapted to induction heating. They have the advantage of providing a bonding area which can be varied to meet specific requirements and a greater safety factor against breakage and leakage can be employed. Lap joints can be easily assembled and permit greater opportunity for the support of the joint members in maintaining proper clearances.

The great strength of silver alloy brazed joints is explained by the fact that thin films are used in the joint. In order to insure a thin film in the joint the joint clearance must be small and

COMPOSITION AND PHYSICAL PROPERTIES

No.	Chemical Composition % Ag	Cu	Zn		Melting Point F	C	Flow Point F	C	Specific Gravity As Cast	Electrical Conductivity Cu = 100%
1	10	52	38	....	1510°	821°	1600°	870°	8.55 g./cc.	20.5%
2	20	45	30	5 Cd	1430°	777°	1500°	816°	8.80 g./cc.	24.4%
3	30	38	32	....	1370°	743°	1410°	766°	8.86 g./cc.	.....
4	40	36	24	....	1330°	721°	1445°	785°	9.11 g./cc.	.....
5	45	30	25	....	1250°	677°	1370°	743°	9.15 g./cc.	.....
6	50	34	16	....	1280°	693°	1425°	774°	9.37 g./cc.	24.4%
7	60	25	15	....	1260°	682°	1325°	718°	9.52 g./cc.	.....
8	70	20	10	....	1335°	724°	1390°	754°	9.76 g./cc.	26.7%
9	72	28	...	....	1435°	779°	1435°	779°	9.95 g./cc.	77.1%
10	80	16	4	....	1360°	738°	1460°	793°	10.05 g./cc.	46%
11	15	80	....	5 P	....	643°	1300°	704°	8.45 g./cc.	14%
12	50	15.5	16.5	18 Cd	1160°	627°	1175°	638°	9.49 g./cc.	23.9%

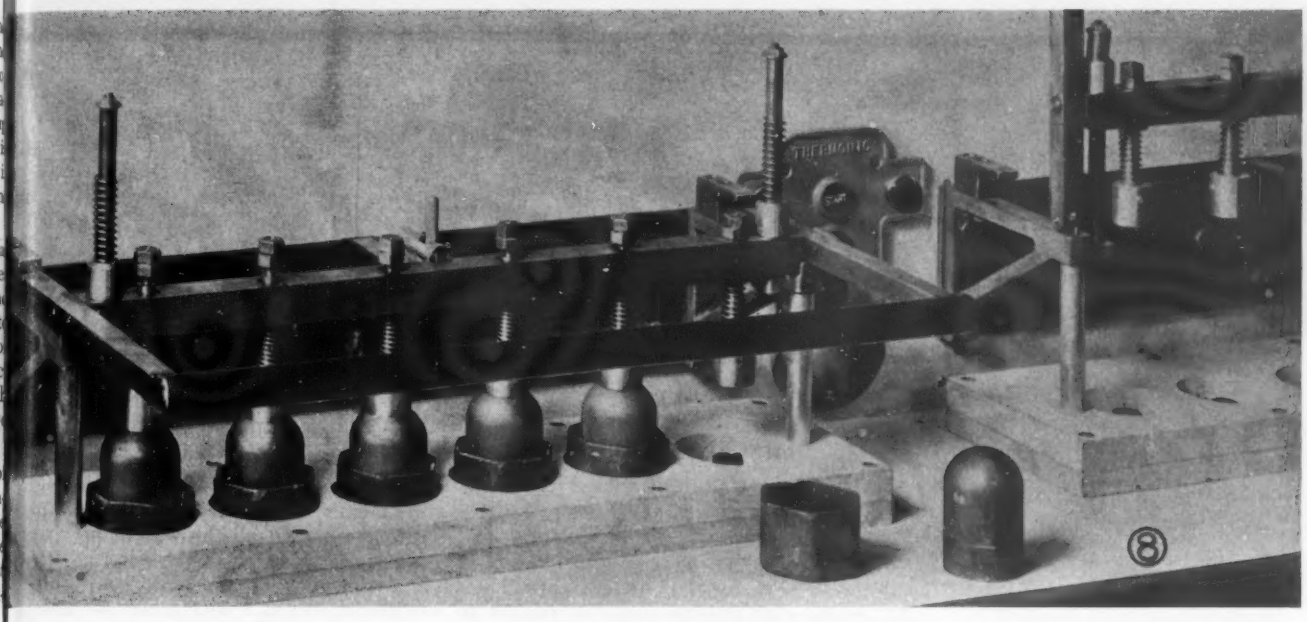


Fig. 8—Pressure fixture for silver brazing domes to nose cups of incendiary bombs

of the order of 0.001 to 0.003-in. Silver brazing alloys when molten are very fluid and water-like and, with joint clearances of a few thousandths of an inch, capillary action causes the alloy to flow throughout the joint area in all directions. It is unnecessary and, as a matter of fact, objectionable to have large fillets which are common with other methods of metal-joining. They do not add materially to the strength of joint and certainly not in proportion to the cost.

Actual practice and years of experience have demonstrated that in silver brazing in order to produce maximum strength of joint a clearance of 0.001 to 0.003-in. is required. This is true, however, only when both parts of the joint are made of metals having nearly equal coefficients of thermal expansion. Also, it is assumed that the joint members are uniformly heated relatively slowly. If these conditions are not met, it then becomes necessary to modify the 0.001 to 0.003-in. clearance. Whether greater of less clearance should be employed will depend on the conditions involved.

For example, consider the joining of some relatively high thermal coefficient of expansion metal such as bronze bushing into a steel sleeve. On certain diameters it would be possible with even 0.003-in. clearance on a side to expand the bronze bushing, upon heating, so much that the fit at the interface of the bronze and steel would be so tight as to prevent actual flow of the alloy into the joint. Greater initial clearance of joint is therefore necessary. If the reverse relationship of metals is employed, that is, the joining of a steel tube inside a bronze sleeve, less clearance obviously would be indicated to have good capillarity.

Let us assume that two tubular members of the same or similar coeffients of thermal expansion metals are being joined, and induction heating is employed to heat the parts. If the coil is placed around the outside member it will get hotter more rapidly than the inside member, causing the former to expand so that a silver-brazed joint of intermediate strength will result. A tighter fit, even approaching as much as 0.005-in. interference of parts could be tolerated. Parts that have a slight press-fit of the joint members have the additional advantage of serving as their own jig to keep them in proper alignment during the heating operation. Also, good heat transfer from one member to the other is possible. If the heating coil were placed inside the tube the reverse condition would develop and therefore a greater clearance would be indicated.

Associated closely with the design and fit of joint are the necessary considerations for applying the alloy. Due to the high degree of ductility and malleability of silver brazing alloys, they can be fabricated into a wide variety of sizes and shapes, thus making it possible to obtain them in the form most convenient and economical for the different conditions under which they are used. With the acceptance of these alloys for use in high-speed, large-quantity production, the use of preplaced inserts of alloy is gaining considerable favor.

When tubular members and fittings are to be joined, rings can be made from rectangular strip or round wire and inserted in grooves cut in the fitting before assembling and heating. The ring inserts must be large enough to provide sufficient alloy to completely fill

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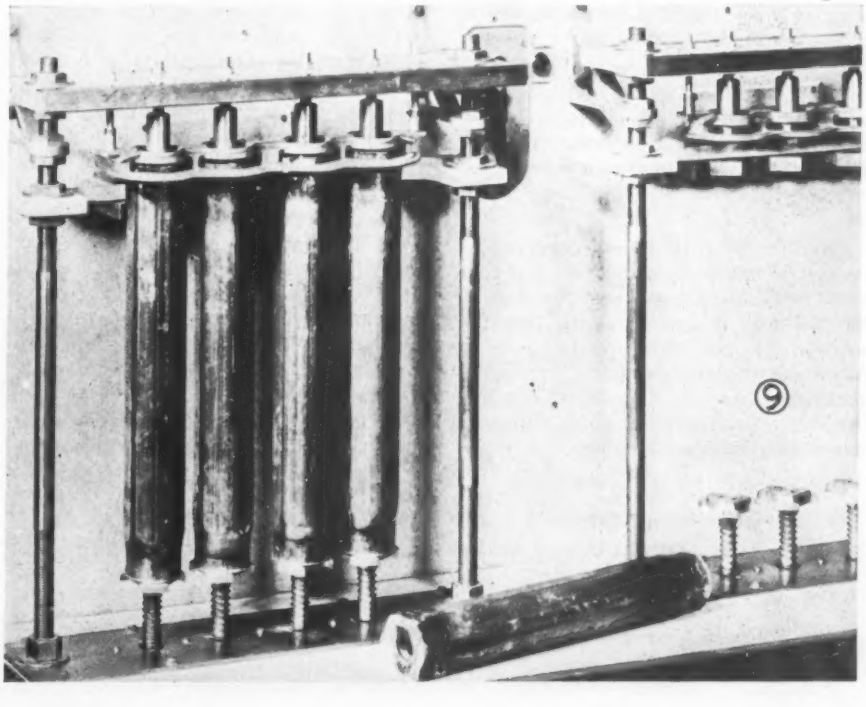


Fig. 9—Silver brazing nose assemblies to casings of incendiary bombs. Coil heats both top of nose and casing simultaneously. Four units brazed in 65 seconds

Plaster Mold

By W. P. BROWN
President
Briggs Mfg. Co.
Nonferrous Castings Division

DEVELOPMENT of a casting investment that would be absolutely moisture free, sufficiently porous to be self-venting, flexible enough to be able to take and accurately hold during pouring any castable form, and yet economical enough to permit competing with existing molding mediums, has long been the goal of much foundry research.

Research workers, while working with sands and other material, have constantly considered plaster as a possible candidate for the role of the ideal molding material.

Plaster as a casting investment is actually centuries old. It has been used extensively in the fine arts for producing bronze statuary. In the 16th century Benvenuto Cellini described the use of plaster for molding small castings. Over the past 30 years or so, plaster has had a limited commercial use in this country—the product made, however, being sometimes of tricky, mechanical design, and a great deal of the business being of an ornamental nature. It never, until recently, has approached commercial production use.

The delay in adoption of plaster has been due chiefly to inability to develop a method of drying the material in a sufficiently short time to permit economical production. This was the basic problem.

Over the past 10 years, however, investigations of the possibilities of plaster as a mold body have been intensively pursued and it appears today that the solution of the chief problems is at hand and the method is on its way to acceptance as an economical method, from the overall cost viewpoint, within its scope, of producing castings.

On Taft avenue in Cleveland, the Briggs Mfg. Co., is operating a large new foundry, utilizing plaster molds exclusively, licensed under the "Capaco Castings Process".

This installation, one of the largest in the country, has incorporated substantial engineering improvements in respect to machinery used and general operation. Plant capacity is suitable to mass production. A wide range of production requirements can be run economically.

The most notable features are the unusual dimensional accuracy, faithful reproduction of fine details, attractive as-cast surface.

The development of this method has been accompanied by the growth of a new concept of molding and pouring practice. It has made necessary the development of mechanical equipment not heretofore associated with foundry work. These facts, emphasized by all men who have worked with the method, require delving into certain fundamentals of casting production to make possible a clear understanding of this new method.

Before discussing the details of the production of plaster mold castings, an abridged outline of its components will simplify following the more technical phases. Briefly, then, the procedure is as follows: The plaster is mixed with other dry elements, to give it strength, and is then mixed with water. The pattern impression is established in the mix when it is semi-set. This is followed by a baking of the mold after the pattern has been withdrawn. Cores, also of plaster, are inserted after baking, then cope and drag joined, and the casting poured

The requirements of the plaster material are that it contain sufficient permeability to provide a ready egress for all air and gas in the mold during pouring; that it be sufficiently strong to withstand the metal without distortion until the metal sets; that it be sufficiently weak so that it will collapse during the shrinkage of the casting after solidification and thus avoid setting up cooling stresses; and, lastly, that the material be devoid of moisture.

Use of Water Essential: The voids in the mixture are created by adding water, then drying out all the water, the space previously occupied by the water creating a network of spaces that has proved most effective as a passageway for gasses to leave the mold. These voids could be achieved by other means. As a matter of record, early experimenters have used ashes for the purpose of providing passageways for the egress of the internal air and gas. But water has proved to be the most effective method.

Following, are more of the details of operation: The plaster and other dry elements are mixed dry in a rotary

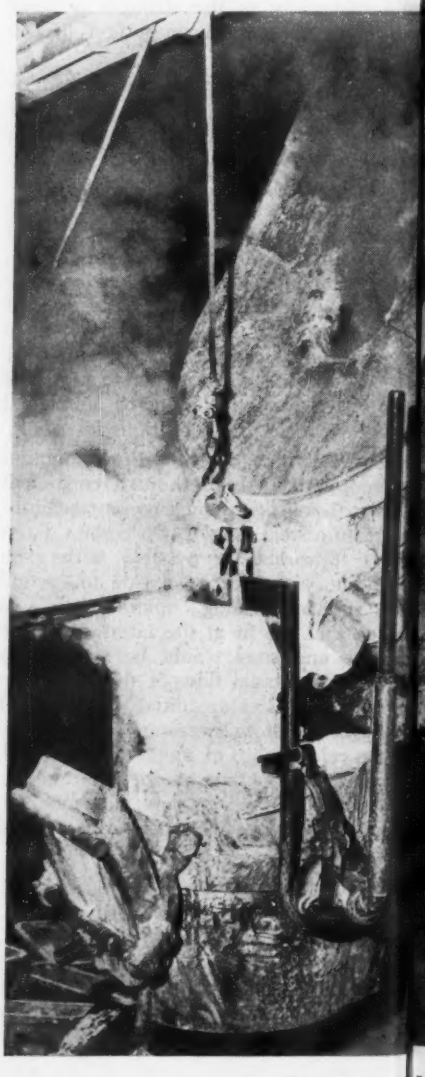


Fig. 1—Aluminum handle is a casting made by the plaster mold method. Insert of threaded mild steel was cast in the handle

Fig. 2—Pouring from large melting furnace into smaller pouring crucibles

Fig. 3—Adding cores to mold after mold has been baked

Fig. 4—Spraying flask and pattern before pouring in plaster mixture

Casting

. . . . affords unusual dimensional accuracy, faithful reproduction of fine details, attractive as-cast surface. Two standard bronzes, one brass and one aluminum alloy now in regular production at Brigg's Cleveland plant

mixer on the upper floor of the foundry building. The water is chemically treated nearby, added to the plaster and then thoroughly mixed. The amount of water added is substantially in excess of what would be required to enable the mixture to set. This excess is deliberate, however, for it increases the number of voids left in the material after drying. From this it is obvious that a form of control over the permeability of the mold material is possible by adjustment of the amount of water added, between the limits of what is necessary for a setting of the plaster

Fig. 5—Castings being shaken out of the mold

Fig. 6—Hourly checks of oven temperature are part of control procedure

and the maximum which can be removed during the drying process.

Before the plaster mixture is added to the flask, all surfaces of the flask and patterns coming into contact with the mold materials are sprayed with a parting mixture to prevent sticking when the mold is withdrawn. The parting mixture is an extremely vital part of the process. Without it, it would be impossible to obtain a clean extraction of the mold.

The flask is now subjected to a vibrating action. The entire flask is then slid off the vibrator and onto the circular setting table. Here it is slowly moved through a tunnel which is electrically heated. Automatic equipment moves the mold from the setting table to a device known as an extractor whose function it is to separate the mold from the flask.

Baking Activity Continuous: The mold is still somewhat soft when it leaves the extractor and in this state it is placed in the oven conveyor. The drying oven is the radiant tube type fired by natural gas. The mold surfaces during baking lose none of their original fine lustre in spite of the high temperature to which they are subjected.

For some time the theory was held that proper drying could be obtained only by slow drying, taking as much as several days' time. It has been proved in the oven used, however, that satisfactory drying, without checking or cracking of the mold can be accomplished in several hours, removing a serious hindrance to the commercial development of the process. This is one of the unique features of the process.

A factor in the speedy drying of the molds is that an effort is made to provide for large volume exhausting of the drying area to assure that as soon as the moisture is drawn to the mold surface and converted into steam, it is immediately removed, thus avoiding the development of an insulating strata of steam about the mold which would retard its drying rate. All the added water is removed during the baking, and all but 5 per cent of the chemically combined water is also removed. The baking activity is continuous.

After baking, the molds are inspected, cores and inserts are added, and cope and drag assembled. Cores are made in a separate department by the same method involved in making the molds.

In this assembling process, any cope will fit any drag from the same flask. The assembled mold is placed on a pouring truck and passes to the pouring department via overhead crane.

Pouring Truck Different: The pouring truck is somewhat different from the usual nonferrous practice and deserves particular attention. It is a structural assembly mounted on four wheels and will hold 12 completed molds. When the truck is in a pouring position, rams mounted in the floor rise beneath each mold clamping the mold firmly.

A pouring tube, inserted in the downsprue hole of the mold, serves as the sprue. The height of the pouring tube can be adjusted to provide any hydrostatic head required. Usual practice is to have the tube about 7 in. high which gives a head of about 2 lb.

The entire pouring truck can be removed as one unit. Thus, after pouring, the rams are lowered, the pouring tube removed by simply breaking off (before the metal in the head becomes cold, but after the mold proper has solidifled) and the truck rolled from the pouring position. A hoist elevates the entire truck up to the second floor where the molds are shaken out.

As the castings leave the mold during shakeout, their surfaces are quite free of plaster except for cored or indented sections. Plaster is removed from these

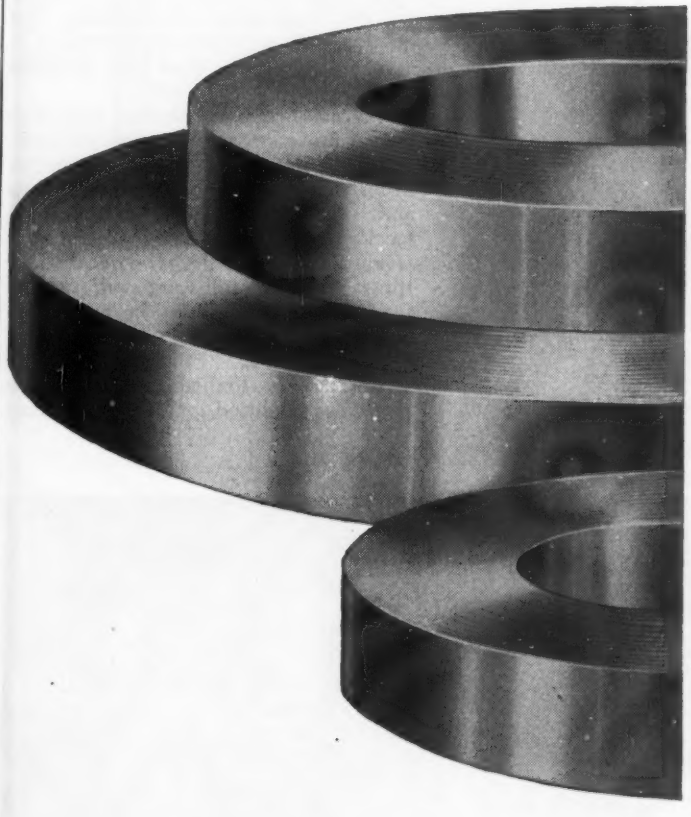
(*Please turn to Page* 140)

FOUR STANDARD ALLOYS

Chemical	No. 10 HIGH STRENGTH YELLOW BRASS Per Cent	No. 100 MANGANESE BRONZE Per Cent	No. 70 MANGANESE BRONZE Per Cent	No. 355 ALUMINUM Nominal Per Cent
Copper	56.0–62.0	60–68	55–60	1.25
Iron	0.75 Maximum	2.0–4.0	0.4–2.0	.....
Aluminum	1.00 Maximum	3.0–7.5	0.5–1.5	.....
Manganese	0.50 Maximum	2.5–5.0	0.1–1.5 Maximum	.....
Tin	0.5– 1.'0	0.50 Maximum	1.00 Maximum	.....
Nickel	0.50 Maximum		0.50 Maximum	.....
Lead	0.5– 1.50	0.20 Maximum	0.40 Maximum	.....
Other Elements	0.25 Maximum	0.20 Maximum	0.20 Maximum	.....
Zinc	Balance	Balance	Balance	.....
Silicon	.....	.....	.....	5.00
Magnesium	.....	.....	.....	0.50
Aluminum and Normal Impurities	.....	.....	.....	Balance
Physical				
Tensile Strength, PSI	55,000 Min.	95,000 Min.	65,000 Min.	15,000-20,000
Tensile Strength—Normal Range	55,000–70,000	95,000–115,000 PSI	65,000–80,000 PSI	.....
Elongation	15%–Minimum	10%–Minimum	20%–Minimum	½-1½%
Elongation—Normal Range	15%–28%	10%–15%	20%–35%	.....
Rockwell "B"	47– 75	.....	60– 80	.....
Rockwell "G"	75–110	60–85	.....	.....
Brinell (500 Kg. Load)	0.50 Maximum	.....	90–120	.....

Follansbee COLD ROLLED STRIP

produced by Craftsmen



Follansbee craftsmen—backed by the tradition of generations of fine steel-making—are producing Cold Rolled Strip with the same skill demanded of other high quality Follansbee steels and steel specialties.

They find little difficulty in adhering to specifications—in delivering Cold Rolled Strip required for most usages.

It is sometimes possible for them to adjust crowded production schedules to accommodate orders to meet unusual situations—the result of the flexibility which only a compact, skilled organization possesses.

You are invited to put Follansbee craftsmanship to the test—on Cold Rolled Strip or other steels. Write, wire or telephone the General Offices . . . or the nearest District Sales Office or Agency.

FOLLANSBEE STEEL CORPORATION

GENERAL OFFICES • PITTSBURGH 30, PA.

Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee. *Sales Agents*—Chicago, Indianapolis, Houston, St. Louis, Kansas City, Nashville, Los Angeles, San Francisco, Seattle; Toronto & Montreal, Can. *Plants*—Follansbee, W. Va. & Toronto, O.

ALLOY BLOOMS & BILLETS, SHEETS & STRIP • CLAD METALS • COLD ROLLED CARBON SHEETS & STRIP
POLISHED BLUE SHEETS • ELECTRICAL SHEETS & STRIP • SEAMLESS TERNE ROLL ROOFING

Ford's Method of Preparing, Applying and Testing

Synthetic Resin Enamels

A PIONEER in the use of synthetic resin enamels for automobile bodies and parts, the Ford Motor Co. has made a definite war contribution through the manufacture of protective coatings for Ford-built war products. These include vehicles, aircraft and tank engines and many special products.

The paint department at the company's Highland Park plant is the focal point of operations. Here, in mills of steel where pigments were ground for synthetic resin enamels for passenger cars, coloring materials for lusterless olive drab and ocean gray paints undergo the same process through dispersal in the resins. These enamels are for use on universal carriers, light armored cars, jeeps, trucks and other vehicles.

Methods of paint application are controlled under Army Specifications. 60-0-1B, painting procedures. A set of specifications is prepared for each item, but, as a whole, they are similar.

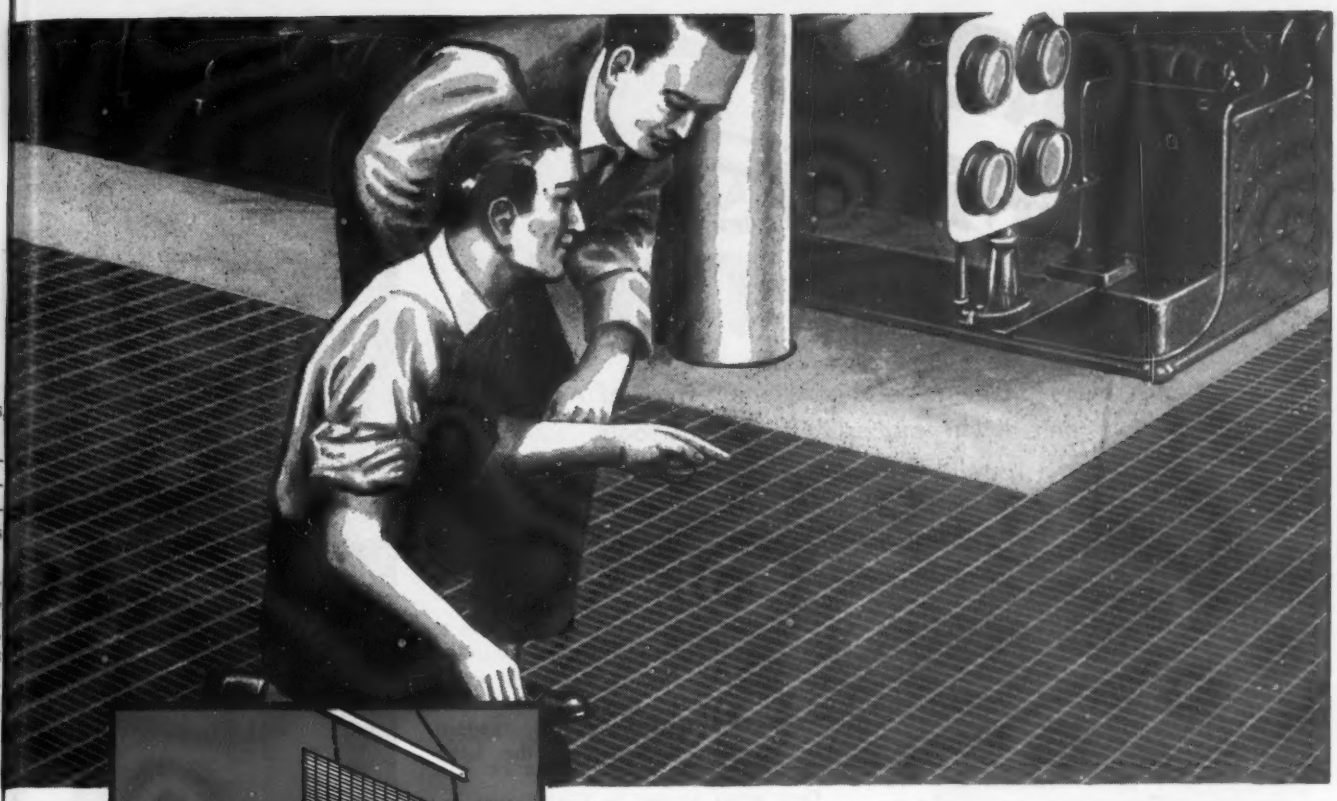
Ford has deviated from the specifications only by utilizing infra-red ray lamps for drying instead of steam ovens, thus shortening drying time. By this method costs have been reduced. A fender, swinging through an infra-red ray drying installation, is shown in Fig. 1.

Primer coats for most of the company's vehicles, including jeeps and trucks, are of the rust inhibiting type containing iron oxide, zinc chromate and zinc oxide in an alkyd vehicle. For wooden parts, a primer coat containing an alkyd vehicle, bone black and lithopone is used.

The finish coat of lusterless olive drab is a combination of chrome green, carbon black, and inert flattening pigments in an alkyd vehicle. Some war products and tractors built under government allocation were painted with ocean gray enamel. Booths used for application by spray gun are well-ventilated. One of these, used for finishing jeep bodies carried by an overhead assembly line, is shown in Fig. 2.

In addition to body finishes, other paints are produced for various mechani-

(*Please turn to Page* 151)

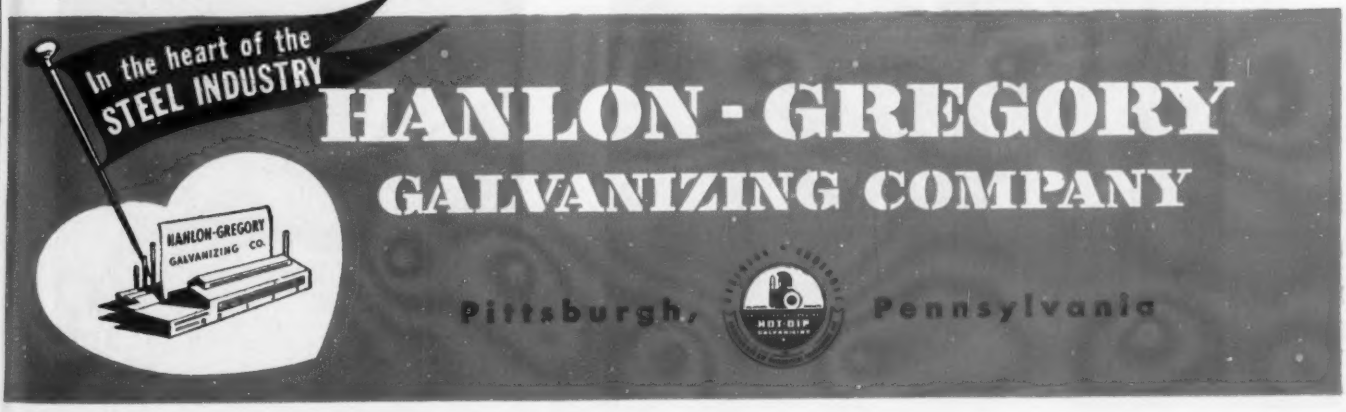


Hot Dip Galvanized Open Steel Flooring *Lasts Longest*

OPEN STEEL FLOORING and grating installations *will* render greater uninterrupted service when protected against rust by the Hanlon-Gregory method of Hot-Dip Galvanizing . . . An investment that pays dividends in savings from expensive replacement and maintenance costs.

The World's Largest Hot-Dip Job Galvanizing Plant *can* increase the life and service of your iron and steel products, whatever they may be, with the *best possible* and *most economical coating* of *protective zinc* . . . Quantities of any size—from truckload to carloads.

THE WORLD'S LARGEST *and Fastest* JOB GALVANIZING PLANT



SEABEE ~~JAPANESE~~ MACHINE TOOLS

This Navy release tells how Seabees speed repair of American equipment with makeshift, captured tools

NAVY Seabees on Saipan have rebuilt smashed Japanese equipment and are using it as the foundation of a machine shop which is described as the envy of every unit on the island. The shop has been keeping Army and Navy equipment in operation at a base where, according to a Seabee machinist, "until recently spare parts were practially unheard of."

A Japanese milling machine, drill press, and two lathes now are serving the Seabees, and other additions are contemplated. The machinery, rescued from the scrap heap, had been wrecked deliberately by the retreating Japanese. American shell hits added to the havoc. Repairmen attached to combat outfits had picked over the remains for the best parts. Although not very much was left, it was enough for the Seabees to use as a starter.

First piece of equipment to be repaired and placed in operation was the lathe trademarked YSK-Tokyo Nippon, shown in Fig. 1. When Navy construction men found the lathe, its main leg was broken into seven parts, the headstock cover was split into twelve pieces, the compound rest was broken off and missing, and the countershaft housing was in five parts. Except for the two drive cones, all pulleys, hand wheels and control knobs were gone or broken.

After rebuilding the machine and working with it a few weeks, the Seabees compared it to the American-made Southbend lathe, but said that, while its husky construction enables it to absorb punishment, it lacks quality workmanship.

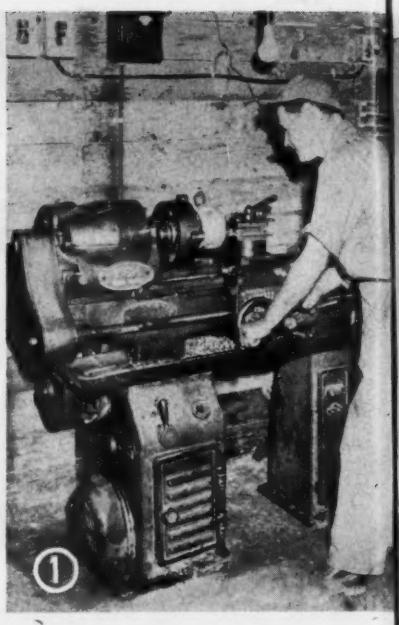
This lathe is an 11-in. model, with a back-geared motor drive. It measures 24 in. between centers. The lead screw operates on metric measure and cannot be used for cutting English standard threads. The Seabees use the lathe principally for chucking work.

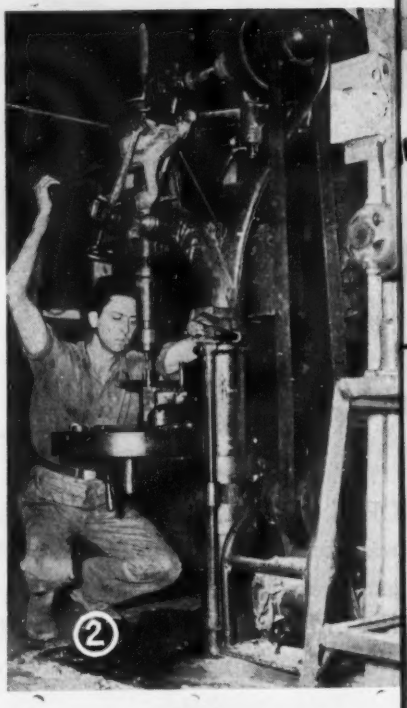
Drill press shown in Fig. 2 was recovered with its table broken off, automatic feed smashed, lever broken, small pulley on the top cone broken, and lower cone assembly missing.

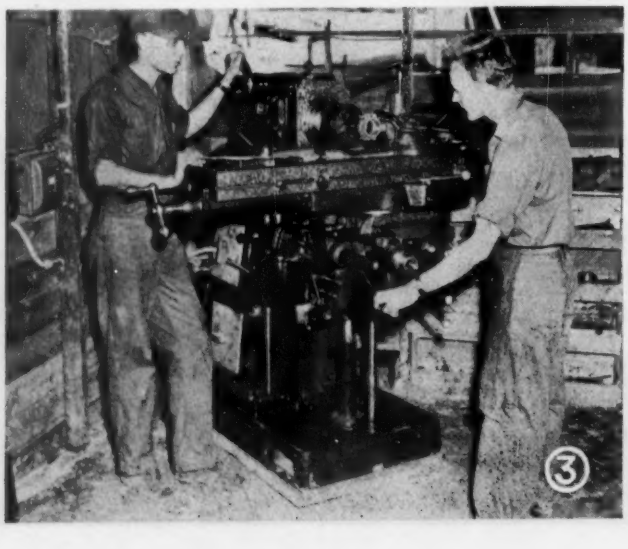
The broken table was repaired by turning it upside down and bolting it to the knee. A boring bar was put in the spindle and a hole bored without the use of a pilot bearing. A steel sleeve was made and pressed into the table. The table then was trued with a dial indicator which was attached to the spindle before boring. The broken pulley was repaired by turning off the broken remains, welding on a 6-in. steel pipe sleeve and machining off a mandrel. All welding was done inside the repaired pulley.

The Seabees consider this Japanese drill press, with the exception of its automatic feed machanism, a far better piece of workmanship than the lathe.

(*Please turn to Page* 154)







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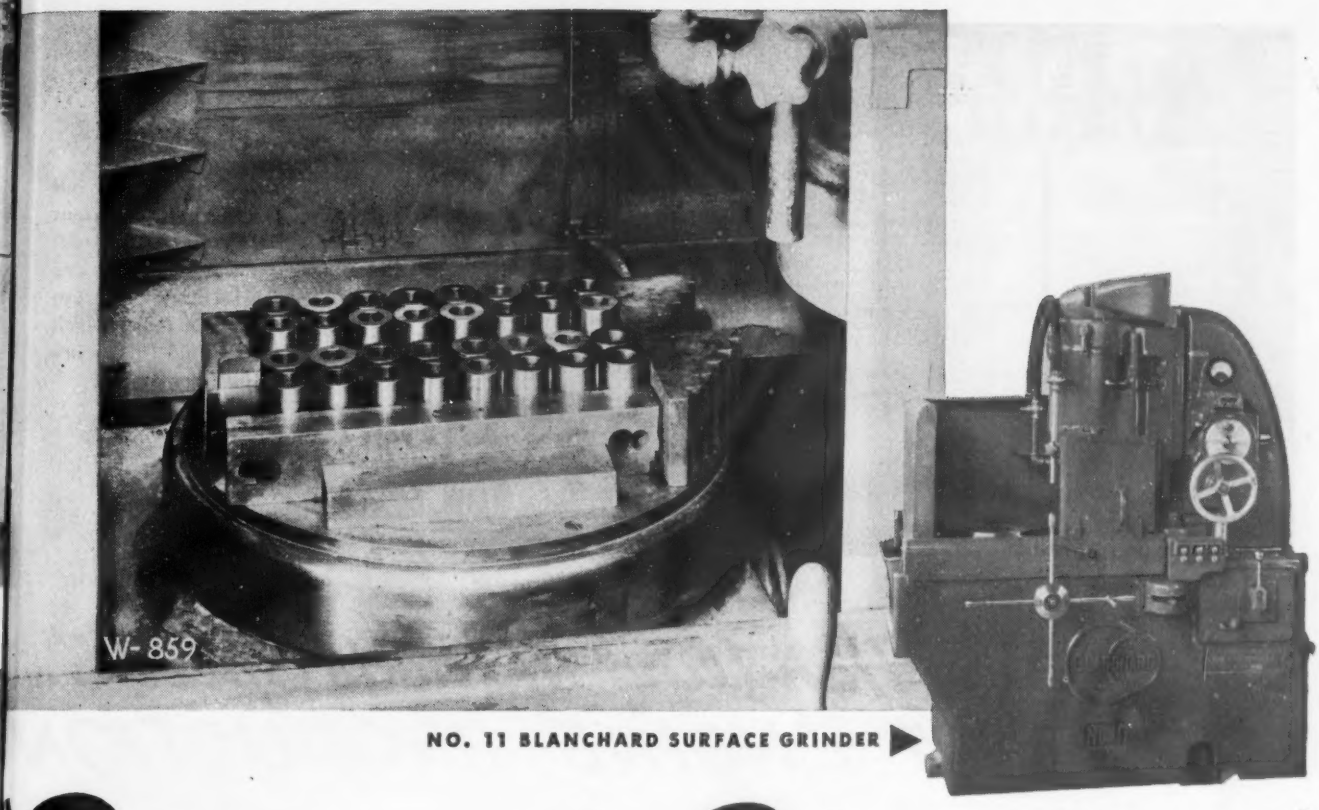

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Material Saving
Fine Finish
Flatness
Close Limits

These cast iron bushings are held on the magnetic chuck and because of their height, almost twice their diameter, they need to be securely blocked by steel parallels and blocks.

The outside diameter of the bushings is 1⅜" and the inside diameter ¾" and they are 2½" long.

.010" of stock is removed from each end to limits of ±.005". Two sides are ground, 60 pieces (120 surfaces) per hour.

Note that in this, as in most other setups on the Blanchard, all holding is magnetic and the machine can be cleared for other work in a few seconds.

Send for your free copy of "Work Done on the Blanchard", third edition. This new book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.

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Fig. 1—Skid-tray-pak used for rail shipment of crankcase sections from a subcontractor, showing unit as received at left. At right are four units knocked down for return for re-use. Except for liners which last 7 to 8 trips, these units are used indefinitely

Automobile Handling Methods Speed... AIRCRAFT ENGINE PRODUCTION

Handles interdepartmental movement of parts in unit loads on skids and pallets; moves loads by rail and highway to and from subcontractors without breaking bulk

By GEORGE E. STRINGFELLOW
Division Manager
Edison Storage Battery Division
Thomas A. Edison Inc.
West Orange, N. J.

AT THE Kenosha, Wisconsin Plant of the Nash Motors Division of Nash-Kelvinator Corp., the handling methods which, in prewar days, helped speed up the production of automobiles, have now been adapted to the same purpose in the production of Pratt & Whitney aircraft engines.

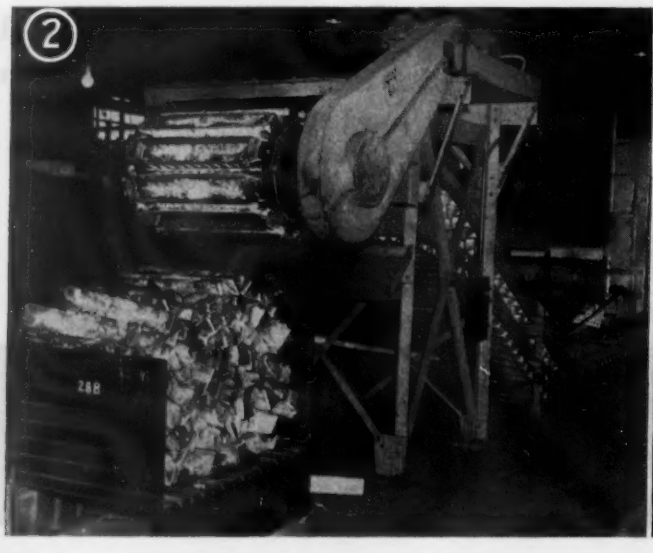
The outstanding feature of the handling system, taken as a whole, is the virtually universal use of unit loads on skids or pallets for interdepartmental movement of parts as well as for movement by highway and rail to and from the plants of subcontractors.

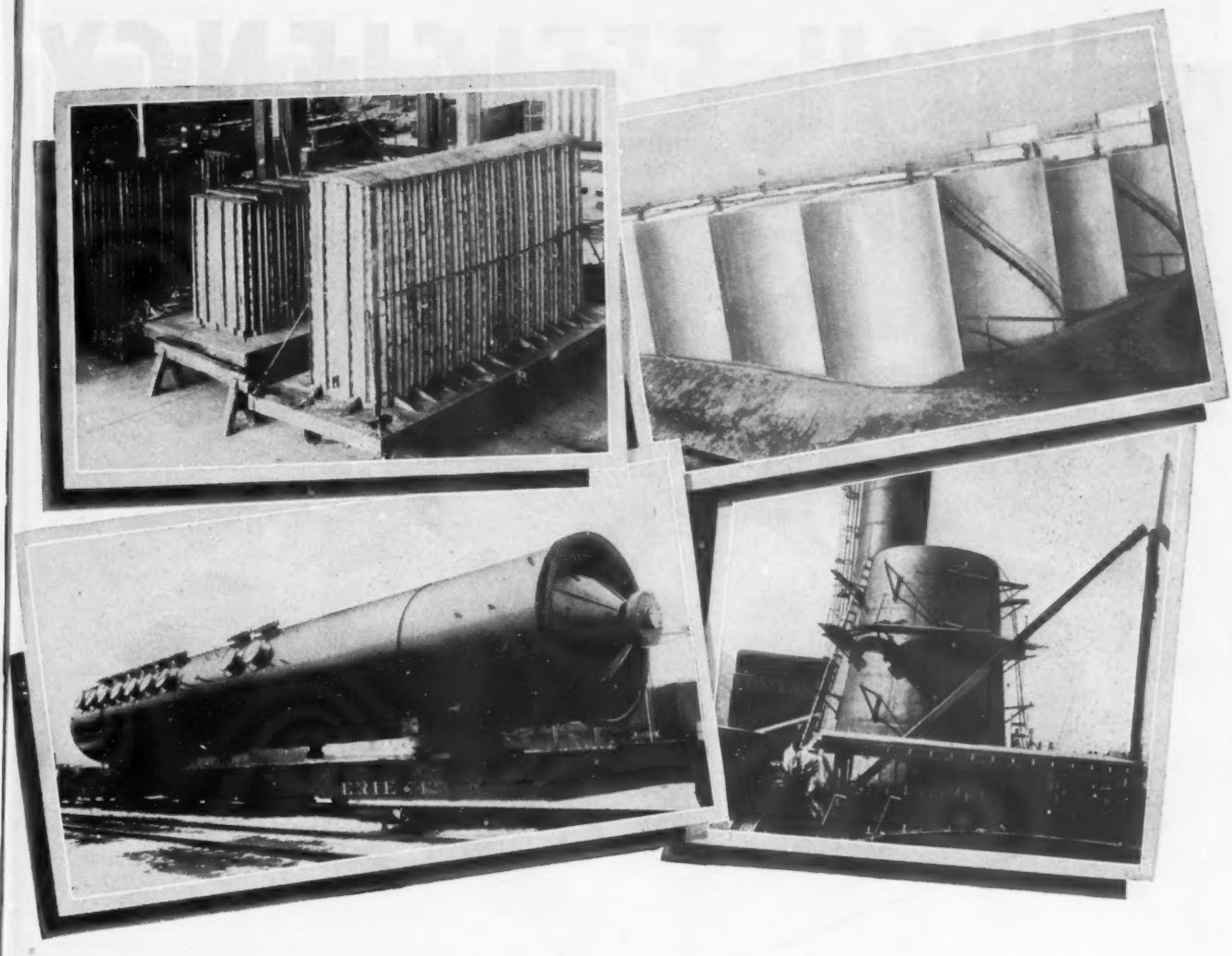
A building, approximately one-half mile in length, which once housed the Nash automobile assembly lines is now devoted to the machining and finishing of crankshafts, propeller shafts; master and articulated rods and all miscellaneous ferrous machining, as well as heat treat, paint and plating. Adjoining this building, is the forge shop and some distance opposite the forge shop is the foundry. In other buildings nearby, are located the nonferrous machining departments and the engine assembly department, including the test cells.

Of the parts originating in the forge shop or foundry, some are finished in the plant, while others are sent to subcontractors for finishing and returned. Other parts, both rough and finished, are

Fig. 2—Even casting of remelted aluminum scrap is done on a mold conveyor shown here. The attendant need only keep the accumulating pile even at the discharge end. All photos from Nash Motors Division

Fig. 3—Batches weighed are stacked temporarily using a pair of pigs in lieu of a skid





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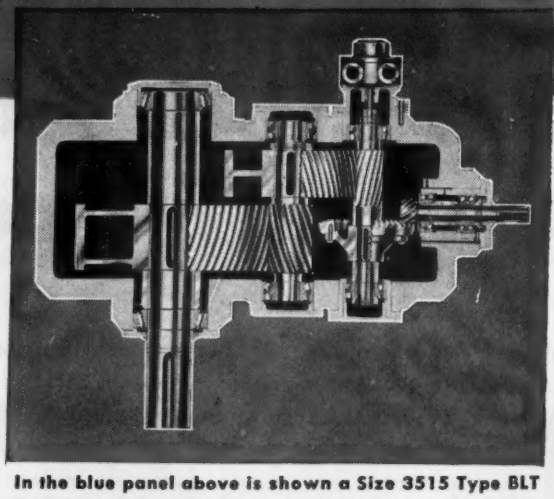
Philadelphia

Spiral-Bevel Speed Reducers

These units provide a dependable means of transmitting power at right angles, either horizontally or vertically. They're made in single, double and triple reductions with standard ratios ranging from 1.5 to 1 up to 238 to 1. The single reduction units employ only spiral bevel gears, while in the double and triple reduction types helical gears are used for the second and third reductions.

An outstanding advantage of Philadelphia Spiral Bevel Reducers is the high efficiency rating, for example, the single reduction unit is approximately 98% efficient. That means all but 2% of the input power is transmitted to the low speed shafts . . . thus often smaller frame size motors can be used with spiral bevel units than with other comparable types of reducers.

Our Bulletin 200 gives further details . . . a copy will be gladly sent in reply to a request on your business letterhead.



In the blue panel above is shown a Size 3515 Type BLT Double Reduction Spiral Bevel Helical unit. The lower illustration is a sectional view of a Triple Horizontal Unit, Size 3600 Type BLT.

Philadelphia Spiral Bevel units are performing satisfactorily in many types of service.

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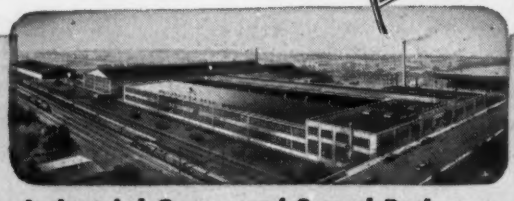


Industrial Gears and Speed Reducers
LimiTorque Valve Controls

Fig. 4—Skid boxes from mold conveyor are picked up by fork truck and go to temporary storage for use in making up batches

Fig. 5—Two types of the many different ones used here, all handled on both pallets and skids

received from subcontractors. The interdepartment distances, therefore, range up to more than half a mile. Movement of finished materials from the finish machining to the bond room (Navy stores) is accomplished by the company's vans, which are also used for highway travel between the plant and subcontractors. It is largely because of the use of unit loads which are moved on and off the vans quickly by industrial trucks, that the materials are kept moving with a minimum expenditure of manpower and a minimum of idle time on the part of the highway carriers.

The type of unit loads used for such purposes is one that was developed before the war by the company, in co-operation with the container manufacturers, for the interplant movement of automotive parts, both by highway and rail, called a skid-tray-pak. It consists of a pallet platform and series of ¼-in. plywood seperators of the same dimensions as the pallet, edged with 1 x 2-in. wood strips on all four sides which serve as a collar or flange to keep in place all of several tiers of paper liners in which the materials are packed.

It represented an important advance not only in reducing the time and cost of loading and unloading cars, but also in reducing damage in transit. In use at the present writing are three sizes: 60 x 60-in. for use in transporting all power sections from machining to bond room, 44 x 54-in. for moving cylinder barrels and rear crankcases from Seaman Body Plant at Milwaukee, and 48 x 48-in. for transporting crankcase sections from a subcontractor located at Madison.

The liners are collapsible and the entire unit can be used repeatedly. The number and size of liners used with a given size of pallet can be varied as long as the overall length and width of the tiers remains the same. The unit for shipping crankcases consists of:

1—48 x 48-in. pallet
4—48 x 48-in. plywood separators
16—liners of 500-lb. double wall corrugated paper

This unit contains an interesting refinement to save strapping time and material. Two straps are applied over the sides and top only, each strap being provided with hooks to engage the stringers of the pallet, a buckle to adjust the tension and a dog with which to tighten the strap in position. Four units in knockdown condition have practically the same dimensions as one unit loaded, so that there is one car of returned dunnage for every four carloads received, and the same strapping can be used both ways. The units are used indefinitely, except the liners, which have to be replaced about every seven or eight trips.

Skid boxes are the principal means by which rough materials are assembled into unit loads for handling in the forge shop, foundry, and heat-treating departments. In the forge shop, billets are piled into skid boxes as they are sheared, while at the hammers and trim presses the forgings are tossed into one skid box and the flashings into another. The loads are handled by platform-lift trucks,

(*Please turn to Page* 112)

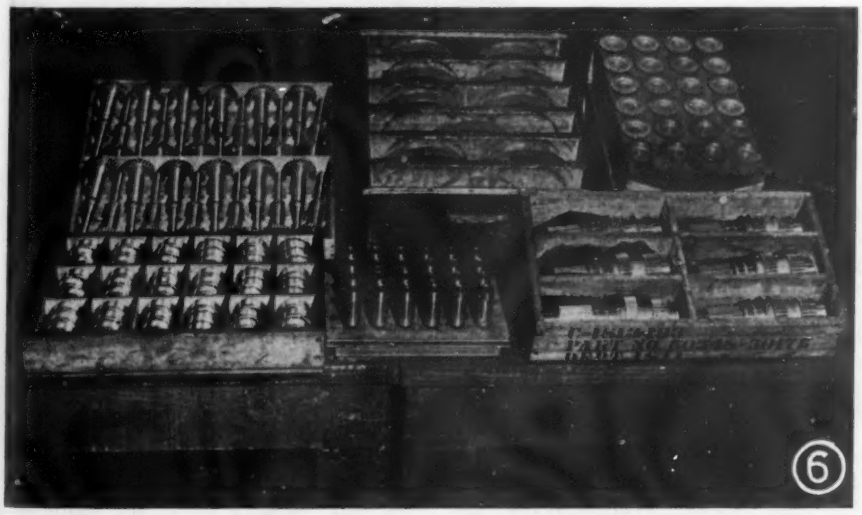


Fig. 6—Six varieties of small parts and the special boxes and racks for handling them

By G. ELDRIDGE STEDMAN

West Coast Steel Mill

Bar and merchant shapes are produced in modern mill described here in the second of a series of four articles devoted to practice and facilities of Columbia Steel Co.

ROLLING mills of Columbia Steel Co. at Pittsburg and Torrance, Calif., are strategically located to serve west coast industrial areas. These mills produce merchant bars and flats, light structural shapes, reinforcing bars and hot rolled strip steel.

Ingots are received from open-hearth department in transfer cars, there being from 70 to 90 ingots per car. The ingots are 13 inches in diameter, varying in length from 62 to 70 inches. These usually are charged direct from the transfer cars into the reheating furnaces upon arrival at the rolling mill. Open-hearth scheduling tends to hold over its week-end production for rolling the following Thursday and Friday, the ingots being produced from Monday to Thursday being charged direct from open hearth to the ingot reheating furnace.

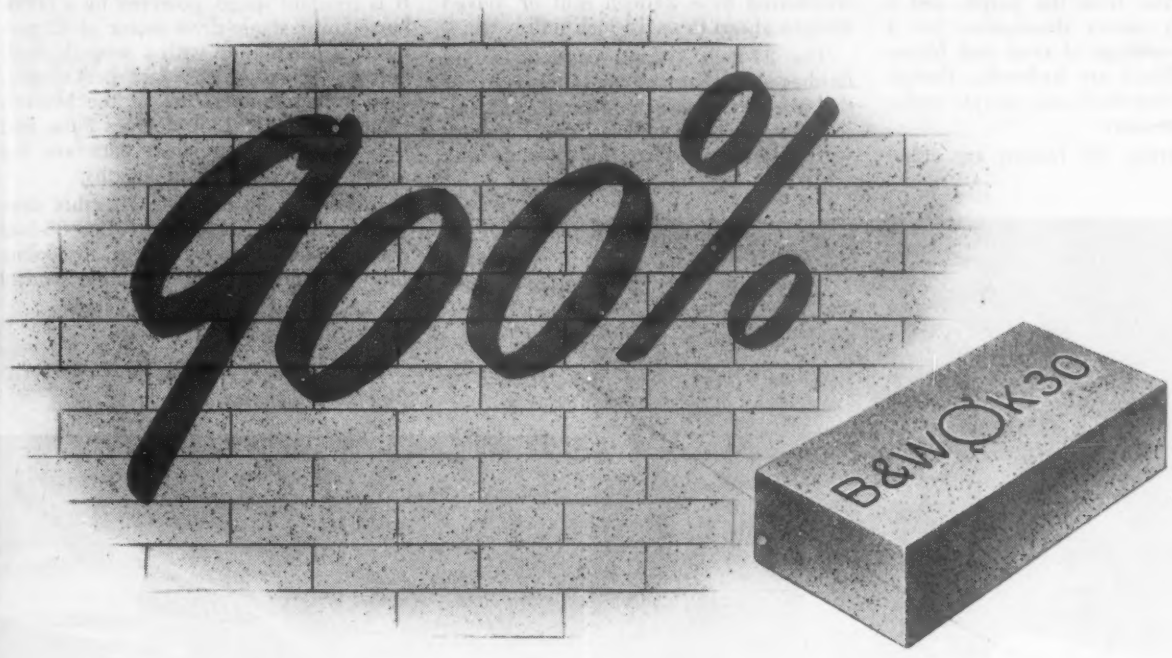
Soaking pits are not used. The two reheating furnaces accommodate 87 ingots each, being of the single-row type. It requires from 3 to 3½ hours' heating to bring the ingots up to proper rolling temperature. The ingots travel about one-third of the way down the furnace at heat, the furnace having an 8-foot hearth at its discharge end—furnaces being continuous with water-cooled skid pipes. They are charged at the front end, the ingots being pushed through with no gravity assistance. The front two burners are gas, the side six burners per furnace are part oil and part natural gas at 1035 Btu. There is alternate discharge of ingots between the two reheat furnaces. The hot ingots are removed by mechanical extractor and placed on the conveyor leading to the blooming mill.

Bloom sizes at the Pittsburg works are 4½ x 10-1/8, 4½ x 8¼, 4-5/8 x 8-7/8, 4-5/8 x 6¼, and 3¼ x 7¼ inches, this variety being necessary to accommodate customer orders. The blooming mill is a 75-inch body 3-inch high mill with manipulator on the downside table which sets the passes. It is powered by 1200-horsepower motor at 585 revolutions per minute driving a constant 26-inch pitch roll at 58.5 revolutions per minute. Such rolls are cast in the Pittsburg works foundry. The first bloom was rolled in this mill on March 29, 1926.

Blooms come to down-cut shears to crop off imperfections, such as top cavities and "pipe". These are controlled

Fig. 1 — Specially-designed cars which hold from 70 to 90 ingots each, transfer 13-inch round ingots from the open-hearth department to the rolling mills

Fig. 2—Cold steel ingots being stored adjacent to ingot reheating furnace



$270. INVESTMENT IN B&W INSULATING FIREBRICK YIELDS $2430. PROFIT

A prominent steel company had been using first quality fireclay brick in its bar-stock forge-furnaces. A change was made to B&W K30 Insulating Firebrick, at an increased cost per furnace of $270.00.

Consumption of fuel oil dropped immediately from 110 gallons per day to 80, a daily saving of $1.80, or approximately $540.00 per year.

The average life of B&W Insulating Firebrick in this application is 5 years. The extra cost of B&W K30's is saved in half a year. The savings made during the remaining 4½ years total $2430.00 —an annual return of 180 per cent on the extra investment.

Lightest in weight, lowest in heat conductivity, high in hot load strength at maximum service temperatures for which they are recommended, B&W Insulating Firebrick show substantial savings. Specify B&W—and SAVE!

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BUY WAR BONDS! BUY MORE THAN BEFORE

THE BABCOCK & WILCOX CO.
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R-213

by the operator from the pulpit, and a board which shows dimensions for a specified percentage of crop and bloom size. The shears are hydraulic, though electrically controlled and operate under 400-pound pressure.

After shearing, the blooms are either transferred to a 24-inch mill or moved straight ahead to an 18-inch mill.

The 24-inch 7-stand continuous mill finishes sheet bar and/or billets. All of the 2½-inch square by 30-foot long billets for the rod mill at the Pittsburg works are finished on this 24-inch mill. It is constant speed, powered by a 5000-horsepower single-drive motor of 82 revolutions per minute with a seventh stand delivery speed of 650 feet per minute. The rolling temperature at the seventh stand is 1800 to 1850 degrees Fahr. and here the billets or sheet bars are hot sawed to predetermined lengths.

Billets for the rod mill, after hot sawing, are pushed across a 107 x 35-foot cooling bed actuated by dogs, to cooling pits. Columbia Steel has close control

(*Please turn to Page* 158)

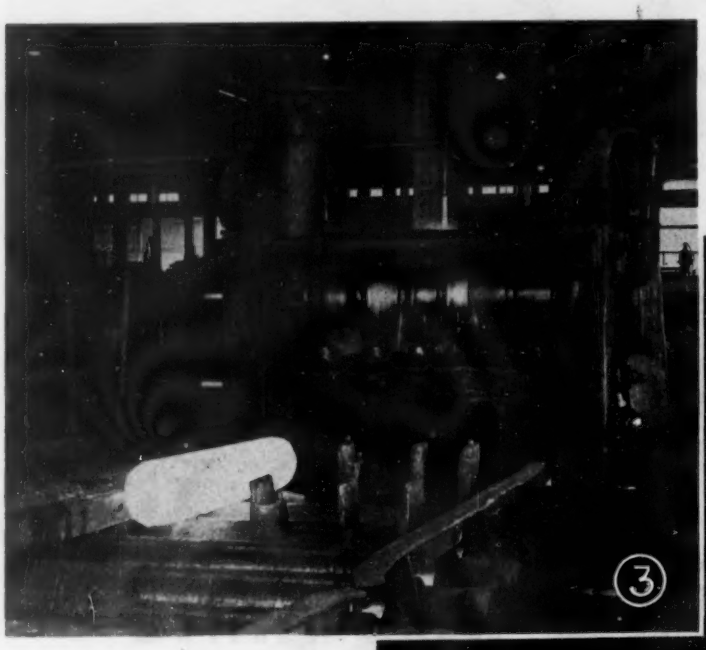


Fig. 3—Heated 13-inch ingot entering first pass of 26-inch blooming mill

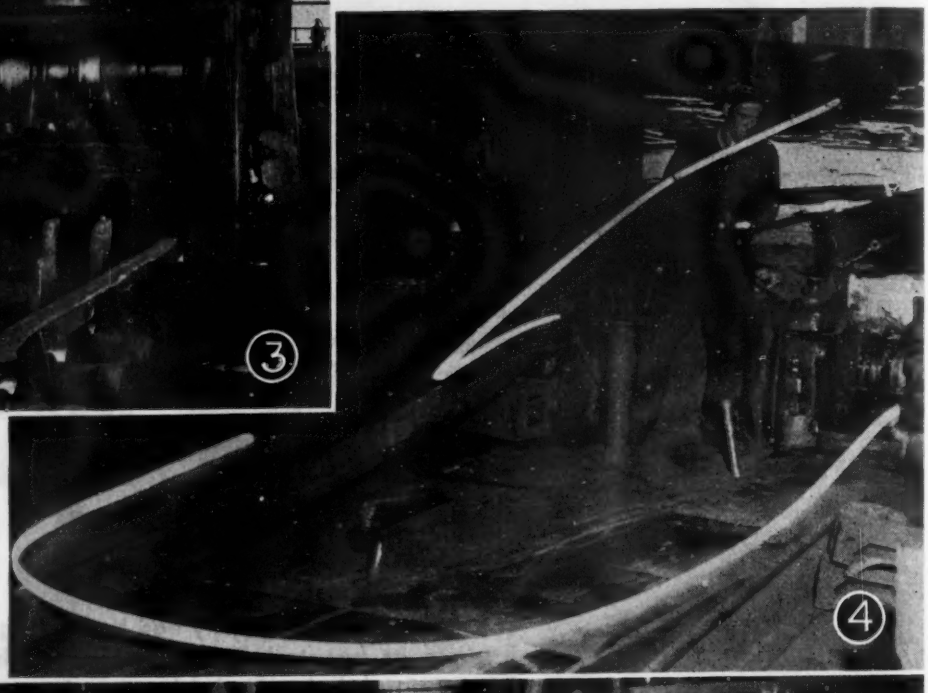
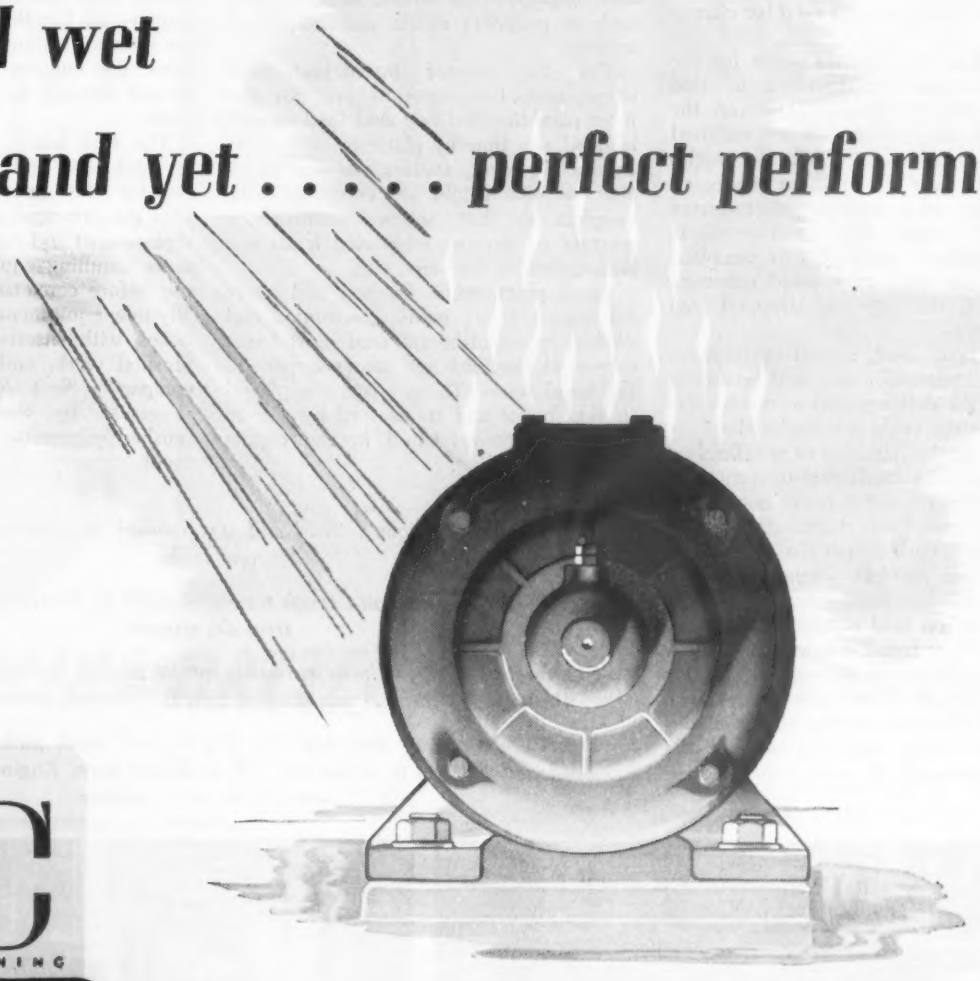


Fig. 4—Strander with bar in his tongs about to feed the end into another pass

Fig. 5—Overall view of 12-inch merchant bar mill showing steel in every stand

Sweated and wet and yet . . . . . perfect performance



DOW CORNING VARNISHES
TRADE-MARK

high → temperature silicone insulation

Humidity, arch foe of conventional insulation, finds its conqueror in Dow Corning 993—the revolutionary new heat stable silicone varnish. Under extreme thermal conditions, DC 993 definitely excludes water and other conducting materials because it remains flexible and does not crack or carbonize.

Perfect performance of motors and other electrical equipment is assured in normal or overload operation. The combination of heat and moisture resistance in DC 993 enables greatly extended operation at temperatures of 175° to 200° C., alternating with idle periods and conditions of extreme humidity.

USE DC 993 . . .

to impregnate motor stators, transformer coils and other non-rotating coils; to varnish Fiberglas and other asbestos served magnet wire; to varnish Fiberglas, mica and asbestos, insulating cloths, tapes, sheets and sleeving.

DOW CORNING CORPORATION
MIDLAND, MICHIGAN
ADDRESS ALL INQUIRIES TO BOX 592

Dow Corning
FIRST IN SILICONES

Aircraft Engine Production

(*Concluded from Page* 107)

some of which are of the high-lift type and are equipped with winches so that these same trucks may be used for changing dies.

In the foundry, batches ready for the remelt furnaces are handled in skid boxes by fork-lift trucks. However, the batches for the pouring line are weighed unskidded, and carried off the scales unskidded, a pair of aluminum pigs being used in lieu of a skid or pallet during temporary storage. For convenience in making batches, scrap is first remelted and cast into pigs on a mold conveyor from which the pigs are dropped into skid boxes.

In the heat treat, annealing furnaces operate automatically and skid boxes are placed at the delivery end to receive the material as the cycle is completed.

For use in the handling of semifinished work during the machining operations, a wide variety of wooden boxes (more than 200 kinds) have been designed and built having inserts to prevent the parts from abrading one another. Depending upon size, they are handled both singly and in combination on skid platforms by either platform-lift or fork-lift trucks. As a general rule, work moves through the various finishing lines in these units, being taken from skid platforms at the start and deposited on other skid platforms at the finish. An example of a unit handled singly on a skid is a box of 42 compartments for master rods. For a portion of the finishing operations these units are carried by van to Milwaukee and return. Various types of wooden skid racks are also employed for larger, heavier parts such as propeller shafts and crankshaft sections.

For the shorter interdepartmental movements, the materials are, for the most part, handled one skid load or pallet load at a time by platform or fork-lift trucks. However, trailers are also available and the trucks are equipped with couplers so that, when circumstances warrant or require, additional loads can be handled on the same trip.

Small parts, when finished and ready for assembly, are greased, wrapped and packed in metal-bound cardboard boxes to protect the finish and conserve space in the bond room. These boxes are placed in skid boxes and transferred by van to the bond room located in the engine assembly building.

In the assembly building, the engines progress on caster assembly stands through the green, disassembly and final assembly, the stands being pushed by hand through the relatively short distances from one operation to the next. Engines are handled on their stands from the lines to test and return by fork truck. After the engines are boxed, they are moved directly to box cars by fork-lift truck.

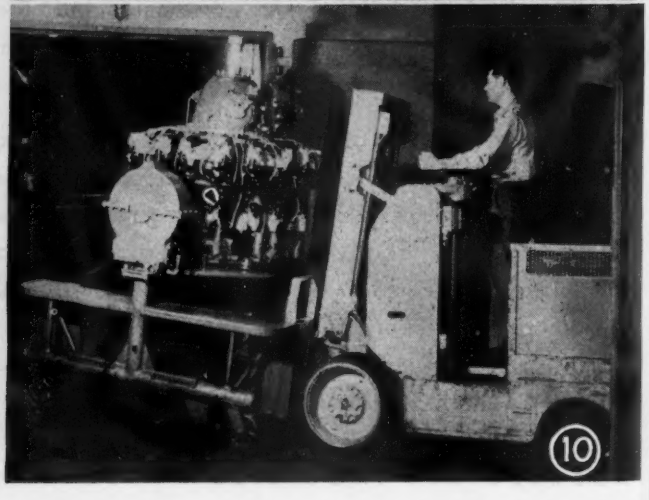
The skid boxes, skid platforms, skid-tray-pak and industrial trucks now in use for the foregoing operations are, with the principal exception of necessary replacement and repairs, substantially the same handling equipment which was in use before conversion. The only essentially new equipment is represented by the boxes with inserts for handling partly finished work, and by additions to the company's fleet of fork trucks made necessary by the work of handling finished engines in the assembly department.

Fig. 7—*Showing how finished and semifinished parts are protected by boxes and racks*

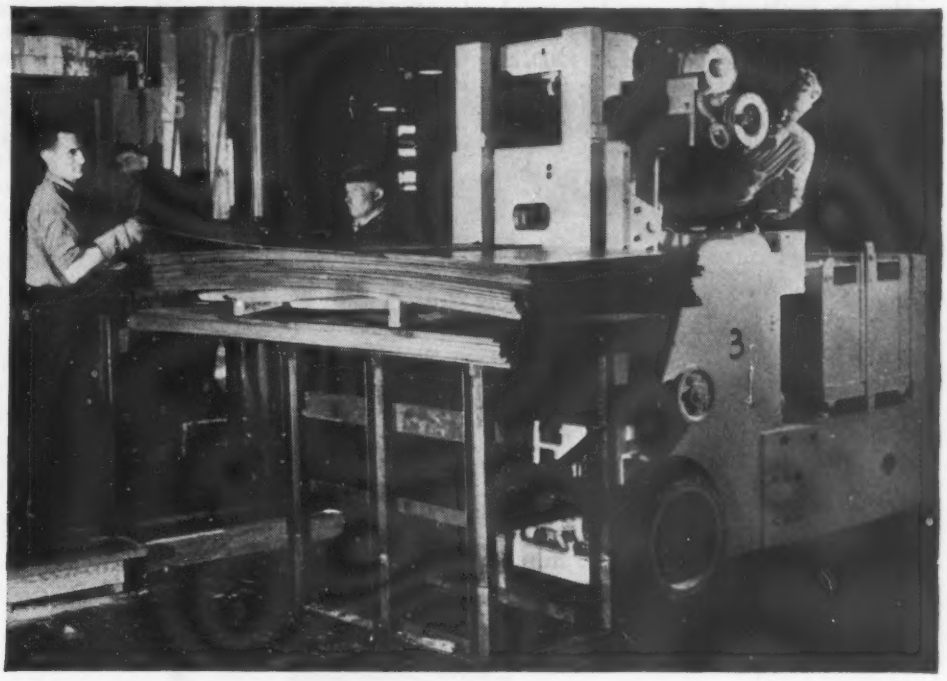
Fig. 8—*Fork truck saves much time and labor in charging furnaces in heat-treat department*

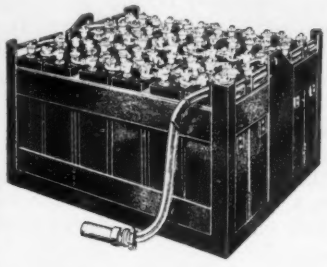
Fig. 9—*In the assembly department, special fixtures permit rotation of engine through* 360° *around a horizontal axis. Rolls permit movement down line*

Fig. 10—*At end of assembly line, Fig.* 9, *fork truck picks up engine on its stand and delivers it to the test cell as shown here. Engine is removed from test cell in same manner*



BATTERY TRUCKS keep machines busy . . .





. . . ALKALINE BATTERIES keep trucks on the GO

In Industrial Trucks, Alkaline Batteries Give You These Important Advantages

- They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- They can be **charged rapidly;** gassing cannot dislodge the active materials.
- They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.
- They are **foolproof electrically;** are not injured by short circuiting, reverse charging or similar accidents.
- They can **stand idle indefinitely** without injury. Merely discharge, short-circuit, and store in a clean, dry place.
- They are **simple and easy to maintain.**

Fast, steady and efficient movement of materials to and from machines, 24 hours a day, is one of the important ways battery industrial trucks are helping to speed production, save man-time and cut handling costs in all kinds of busy plants. A continuous flow of materials in process is maintained without interference to machine operations. Work is spotted in the most convenient and accessible locations for feeding each machine with the least manual handling.

Keeping machines busy on round-the-clock schedules is a continuous stop-and-go handling job in which the battery industrial truck excels because of its inherent flexibility, high availability and economy.

Exchange batteries keep the truck continuously supplied with power. While one battery operates the truck, another is being charged. Except for the few minutes needed to change batteries, the truck need not stop for servicing its power unit. Its electric motor drives have a minimum of wearing parts; are inherently simple and trouble-free. The truck starts instantly; accelerates smoothly; operates quickly; gives off no fumes; consumes no power during stops. Not only does it make efficient use of power but the current used for battery charging is the lowest cost power available.

Altogether, the battery industrial truck is one of the most dependable and economical types of handling equipment — especially when powered by Edison Alkaline Batteries. With steel cell construction, a solution that is a preservative of steel, and a fool-proof electrochemical principle of operation, they are the most durable, longest lived and most trouble-free of all batteries. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J.

Edison
ALKALINE BATTERIES

Electric HEAT-TREATING Furnace

New semiautomatic unit raises temperature of aluminum alloy parts 860 degrees in 25 minutes. Automatic quench and push-button controlled load truck are other features

PRODUCTION of aluminum alloy parts for C-48 Commando transport planes at the Curtiss-Wright St. Louis plant is facilitated by new high-speed aluminum heat-treating equipment. With this equipment, a work load of 1200 lb of aluminum alloy, together with its 900 lb truck, can be heated from 70 to 930°F within 25 min, if the furnace already is stabilized at this latter temperature before the load is conveyed into the heating chamber.

Recently installed, equipment consists of a General Electric furnace, control, and loading station, and a quench chamber especially designed by Curtiss-Wright. Unusual features of this installation include an automatic water spray quench which minimizes quenching distortion, and a push-button controlled load truck which not only provides a centralized operating position but eliminates the human variable in the quenching operation. In addition, a precision temperature control is incorporated in the equipment which, with other advantages, prevents "overshoot" as the temperature reaches the control point.

Overall length of this installation is 58 ft. Furnace proper, which is 21 ft long by 19 ft 6 in. high at its highest point, will accommodate a load truck approximately 5 ft wide and 14 ft long. Three separately controlled circuits of heating units mounted on furnace walls, and four 28-in. diameter motor driven fans mounted on the top of the furnace recirculate air at approximately 50,000 cfm. The lift type door is tightly sealed in the closed position by an air-operated clamping mechanism, and a 2-speed motor hoist provides a "slow-down" stop at the end of the door travel, easing the shock of the stopping.

Three lines of rollers, shown in front of the furnace in Fig. 2, provide a "road bed" for the load truck, which is pulled in and out of the furnace by a reversible chain driven by a 2-speed, high torque motor. The truck is fabricated of heat-resisting alloy, and is made in four sections coupled together to provide flexibility and to minimize distortion due to repeated heating and cooling.

The jet quench, shown in Fig. 1, consists of a series of co-axial pipe loops to which are attached 300 nozzles. Through these nozzles pass approximately 2000 gal of water at each quench. The spray lasts for 30 sec, and a pump returns the water to the supply tank after each operation. Whenever the water reaches 100°F after quenching, it is drained off and replaced with cool water.

A push-button station located near the front of the furnace controls the conveyor, and also the furnace, quench doors, and quench valves. This is shown at right

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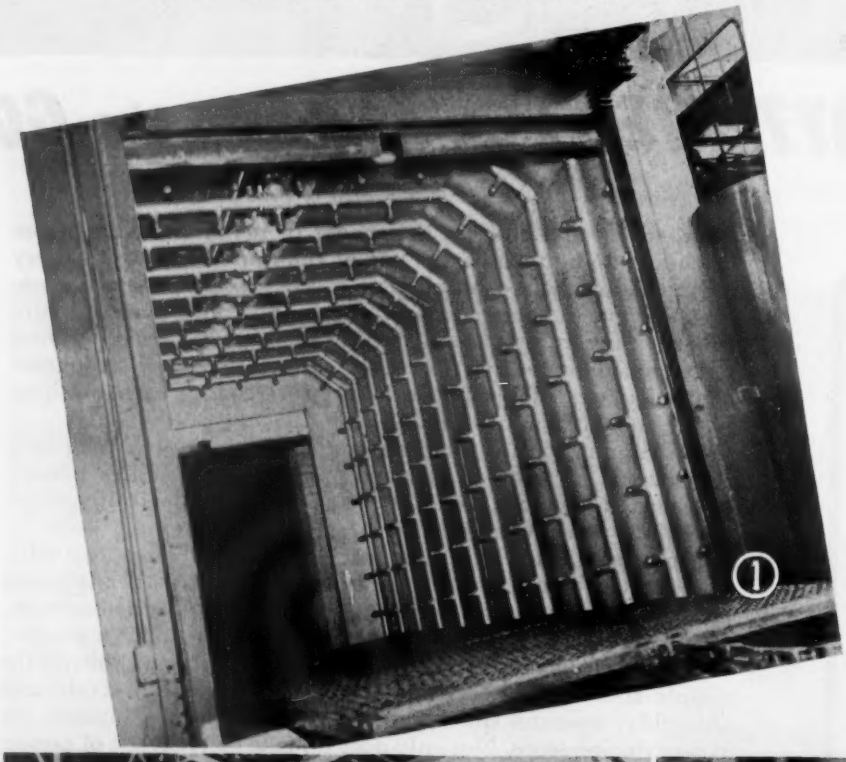
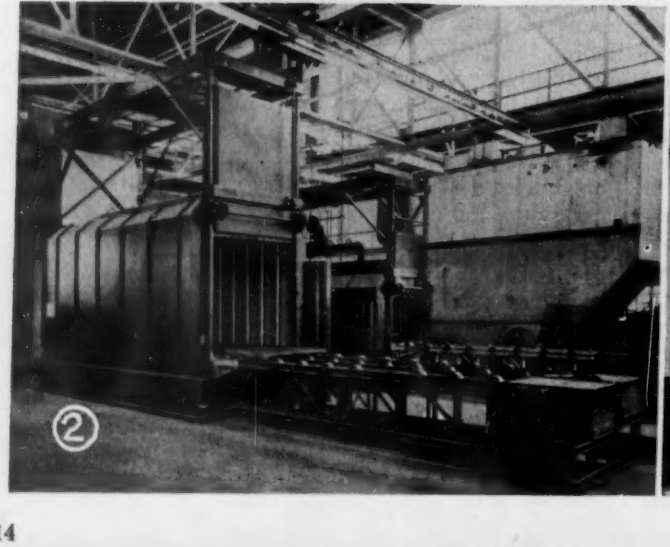
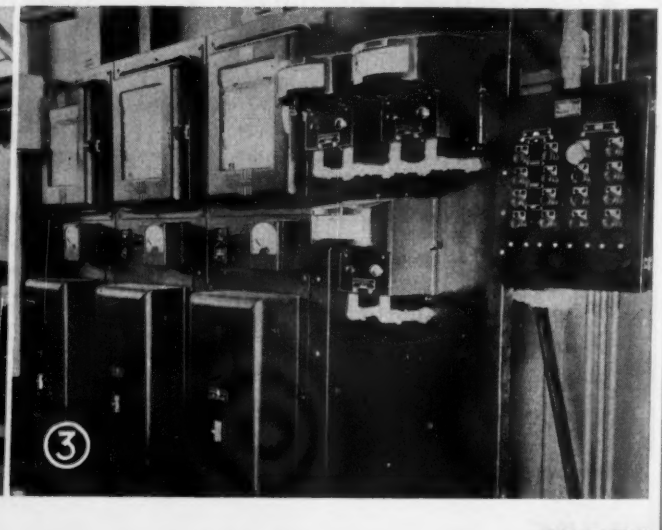


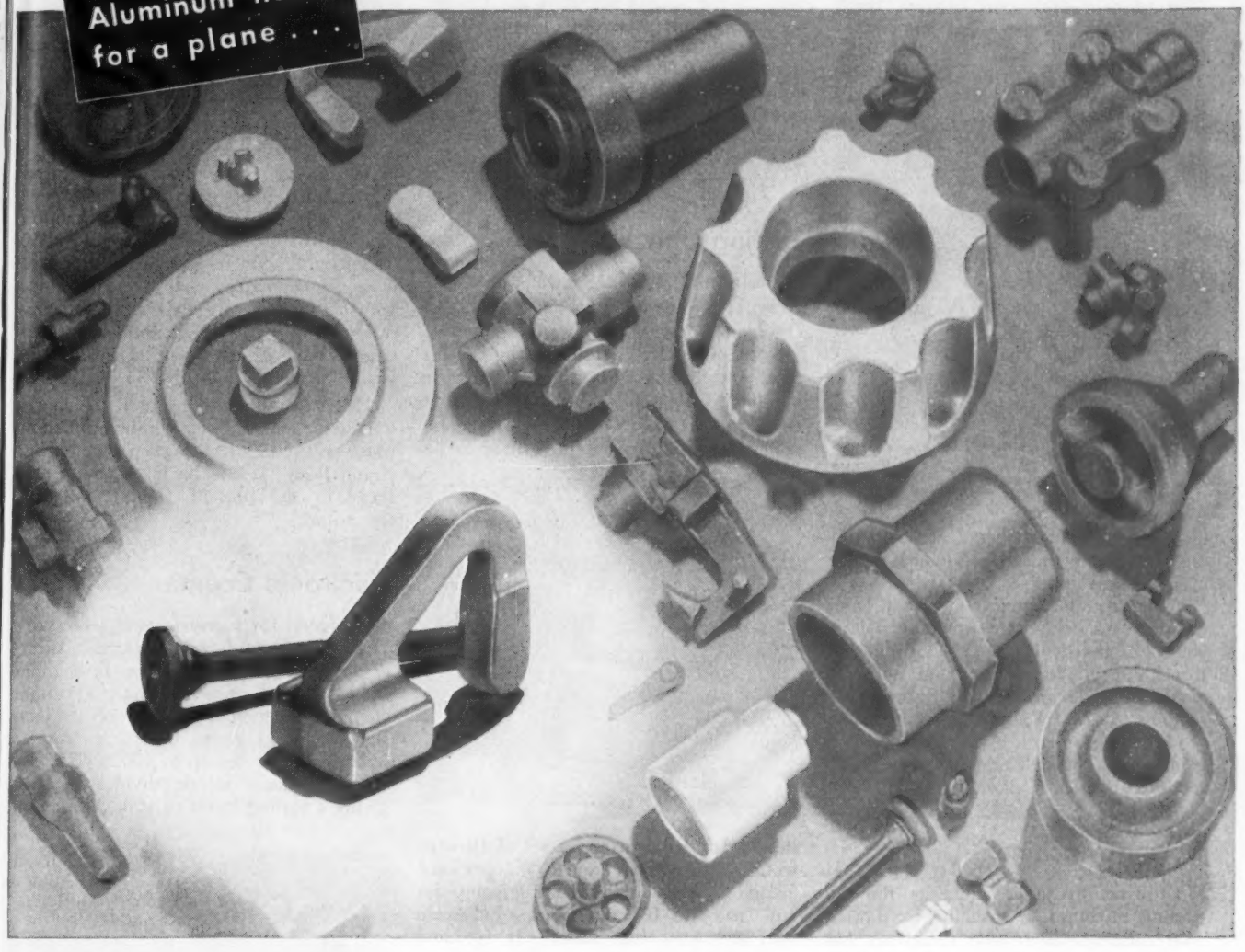




Brass repair rivet for a valve . . . Aluminum "hook" for a plane . . .

SCOVILL FORGINGS

for close tolerances and extra strength



Repair rivets for valves must combine close tolerances with great strength. So Scovill extrudes them from brass slugs . . . a one-operation process to meet specified tolerances at low cost.

Structural components of aircraft frames must combine maximum strength with minimum weight. So Scovill, with typical versatility, makes the hook-shaped part of aluminum alloy . . . partly by hammer forging and partly by die pressing to maintain close tolerances.

Whenever you have a problem in metal parts production, follow the lead of more than 3,000 firms who have found that Scovill usually produces better metal parts at the same price or equally good at lower cost. Let Scovill apply to your forgings the ingenious designing and top-notch die-making that have earned for Scovill the title of "Masters of Metal".

Scovill's ability to produce for you the one *right* forging from the one *right* metal is proved in the free booklet, "Masters of Metal". Fill in the coupon below and mail it today.

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Please send me a free copy of *"Masters of Metal"* booklet describing your facilities. I am interested in the metal forgings applications checked.

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INDUSTRIAL EQUIPMENT

Overhead Guards

To provide protection for lift truck operators where they might be endangered by falling objects, Towmotor Corp., 1226 East 152nd street, Cleveland 10, has developed overhead guards to fit all

their models. Constructed of steel tubing and easily installed, guards come in two standard sizes.

When installed, guards extend in front of, over and behind the operator. Transverse lengths of 1½ in. steel tubing in front and above are notched and arc welded to side members of frame. Back sections of side frame members are made of 1½ in. standard black steel tubing, front sections which telescope over back sections are 2 in. in diameter.

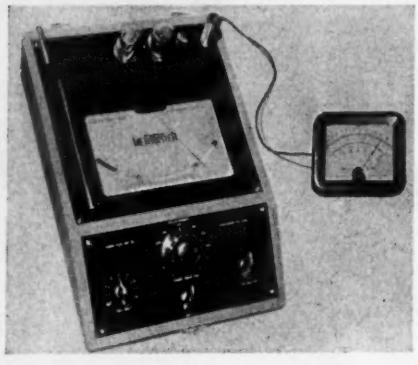
Boring Machine

Utilizing hydraulic units as the actuating mediums, a machine for boring axle housings from two directions has been developed by LeMaire Tool & Mfg. Co., Dearborn, Mich. Two No. 5000 units are positioned opposite each other on a long fabricated base with an index type workholding fixture centered between them.

Two boring bars are guided by bearings at each end of the axle and by pilot bushings within the housing. The machine rough bores eight holes within housing and at the same time faces ends. In the second operation the roughing bars are replaced by finishing bars to obtain the following finished diameters: Two 2.685-in. holes, two 2.654-in. holes, two 2.623 holes and two 2.592-in. holes, all within 0.002-in. tolerance. Chucks facilitate releasing of bars from units and allow the fixture to index when changes are made.

Testing Unit

Designated as Metertester, a multirange instrument with self-contained regulated power supply and control equipment for use on 110 v ac, 60 cycles, is announced by Marion Electrical Instrument Co., Manchester, N. H. It is composed of a stepless vacuum tube voltage control; an 8½ in. Mirror Scale



standard instrument and a set of 10 wire wound resistors, accurate to 0.1 per cent Range of the unit is 25 microamperes full scale, to 10 milliamperes full scale and 0-100 v full scale. It is hand calibrated by the potentiometer standard cell method. Resistors are wound of manganin wire on ceramic forms to an accuracy of 0.1 per cent and are triple impregnated and tropicalized.

Vacuum control, using a type 6N7 as a grid controlled variable resistor gives complete control of power to standard 0-110 v, dc. Power supply is a conventional unit with a 6 x 5 full wave rectifier with a type VR150-OD3 voltage regulator to the tubes.

The unit is distributed by Electrical Instrument Distributing Co., 458 Broadway, New York.

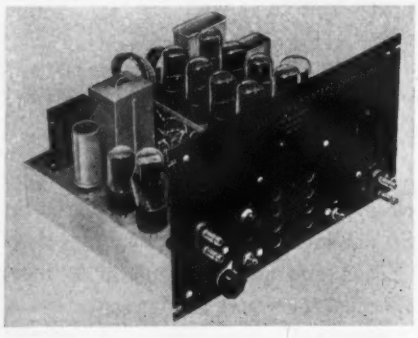
Air-Operated Clutch

Installation of a new air-operated stop-motion clutch on alligator shears is announced by Hill Acme Co., Canton Division, 6400 Breakwater avenue, NW, Cleveland 2. By tripping a hand or foot lever, shear makes one cut and stops with jaws open, giving the operator control with safety. Continuous jaw operation may be obtained by an instantaneous adjustment.

This silent operating clutch which requires air pressure of 70 lb, eliminates practically all wearing parts except clutch face. It can be installed on any shear in the present Canton alligator shear line.

Electronic Counter

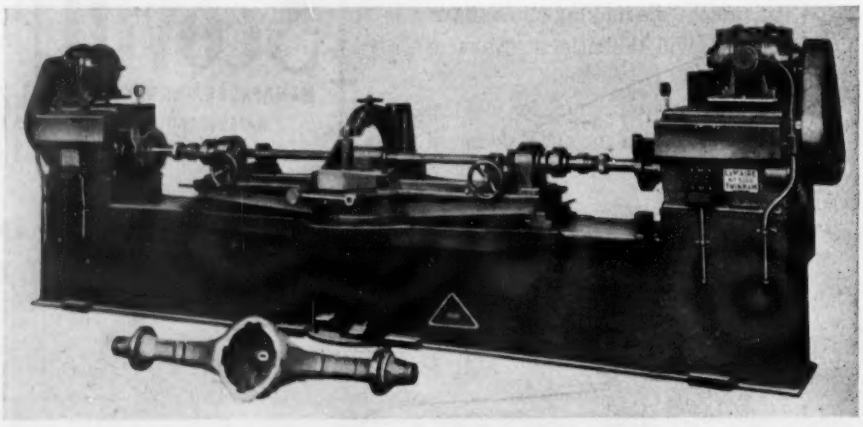
Designed for industrial and laboratory uses, a new two decade electronic counter is announced by Potter Instrument Co., 136-56 Roosevelt avenue, Flushing, N. Y. It is actuated by a closing contact, sine wave, or pulse input, as from a photo-cell, at rates up to 1000 cycles per second. Each decade divides by ten, giving a scaling factor of 100. The count



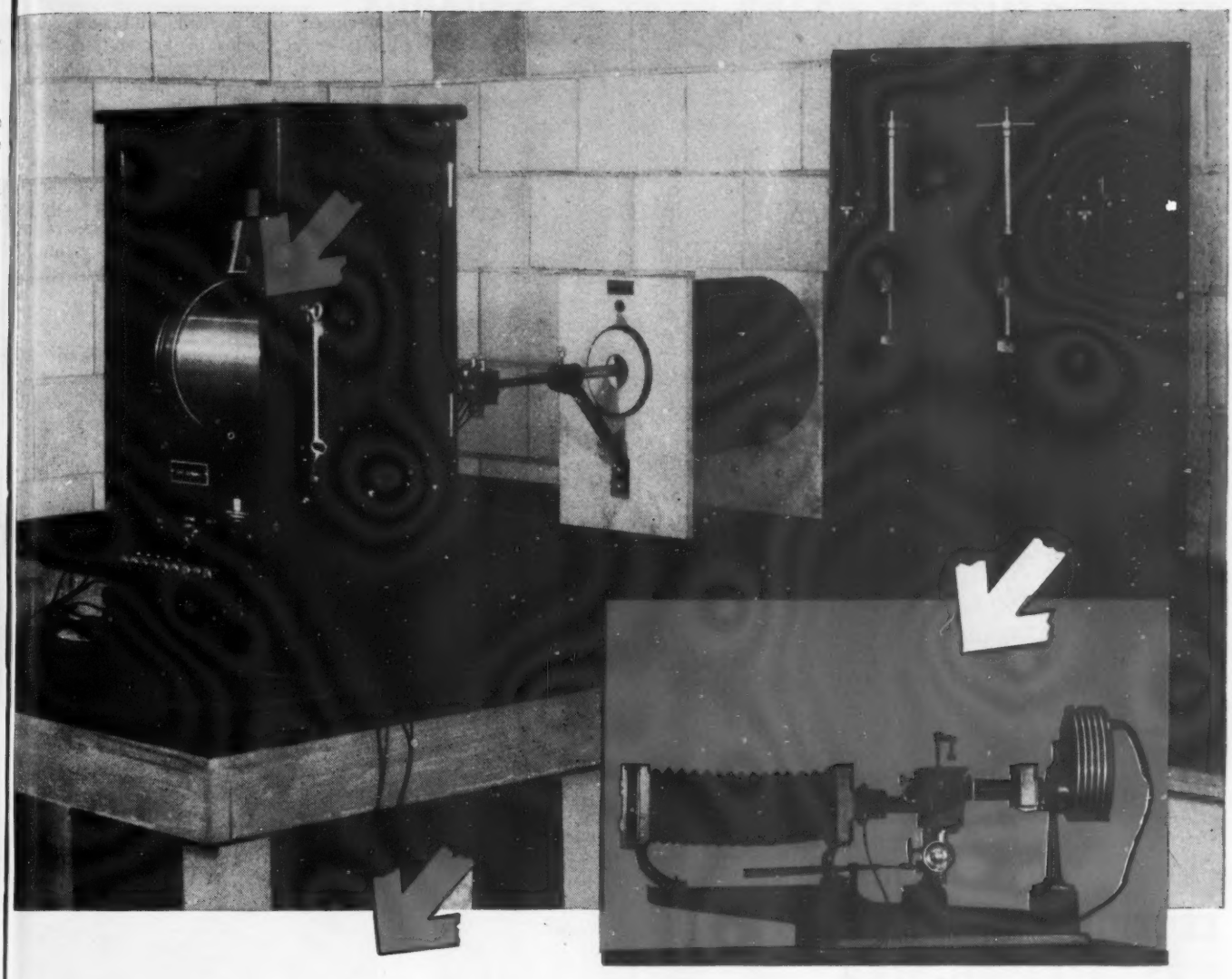
for 0 to 99 appears on two banks of neon lamps.

A telephone-type relay is connected to the contour output and the contacts of this relay close once for each 100 input cycles. These contacts are connected to an output terminal. A conventional electromechanical counter may be connected to the output terminals to extend count to as many places as desired.

Recommended applications of the unit include counting rates exceeding 10 cycles a second and counting and calibrating the actual number of cycles that resistance welding timers apply. The unit can be used as an interval timer by connecting it through a switch to a known external frequency. When switch



(All claims are those of the manufacturer of the equipment being described.)



Your Structure is Better.. IF THE

STEEL STRUCTURE IS CORRECT

The whole story of a steel section is bound up in the tiny, individual grains of the steel—their size, nature, position, and relationship, one with another. That's why it is important to you that PSF has and *uses* in its constant laboratory testing, such equipment as the Critical Range Apparatus for determining transformation points of steel, illustrated above, and the Photo-Microscope shown in the inset. They're part of the reasons why castings by PSF, aside from dimensional accuracy, have the clean soundness and strength needed to realize your best hopes for *your* product.

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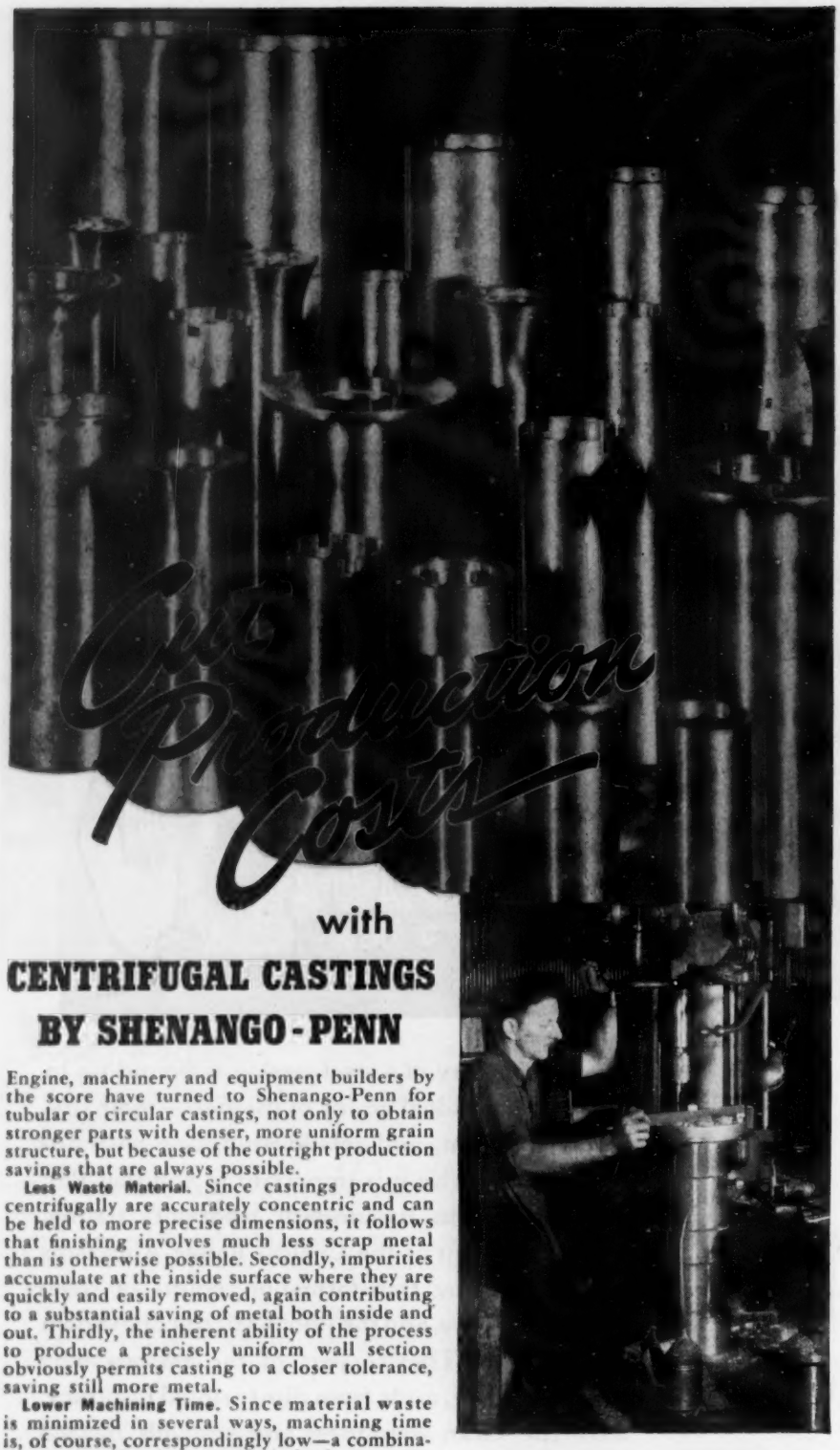


with

CENTRIFUGAL CASTINGS BY SHENANGO-PENN

Engine, machinery and equipment builders by the score have turned to Shenango-Penn for tubular or circular castings, not only to obtain stronger parts with denser, more uniform grain structure, but because of the outright production savings that are always possible.

Less Waste Material. Since castings produced centrifugally are accurately concentric and can be held to more precise dimensions, it follows that finishing involves much less scrap metal than is otherwise possible. Secondly, impurities accumulate at the inside surface where they are quickly and easily removed, again contributing to a substantial saving of metal both inside and out. Thirdly, the inherent ability of the process to produce a precisely uniform wall section obviously permits casting to a closer tolerance, saving still more metal.

Lower Machining Time. Since material waste is minimized in several ways, machining time is, of course, correspondingly low—a combination saving that is attractive indeed.

Bulletin 143 gives complete information about Shenango-Penn centrifugal castings including other advantages and specifications of the various available alloys. Write to the Shenango-Penn Mold Company, 453 W. Third Street, Dover, Ohio.

In addition to foundry facilities, Shenango-Penn is well equipped for all kinds of machining and finishing operations. Here flanges of bronze castings are shown being drilled.

ARMY NAVY

SHENANGO-PENN

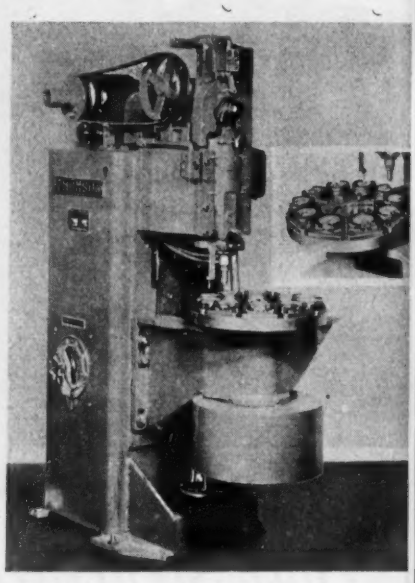
ALL BRONZES • MONEL METAL • ALLOY IRONS

is closed and opened, unit will count number of cycles of known frequency that have passed in closed switch time interval, giving a reading in terms of number of cycles of known frequency. The 60° cycle line may be used as the known frequency.

The unit uses a complement of eleven tubes. It can be supplied with switches to make it predetermining. Operation is from a 60 cycle, 105 to 125 v line.

Welding Press

No. 1 welding press offered by Thomson-Gibb Electric Welding Co., Lynn, Mass., is equipped with a 10-station dial feed for welding at the rate of 15 to 45 pieces per minute. The unit shown here handles the opening keys that are welded to tin cans. Keys are



dropped into the dial pockets and fed around for welding operation.

The unit has a transformer capacity of 30, 40, 50 or 75 kva. Throat depths may be 12, 18, 24 or 30 in. Sliding head is actuated by a special cam designed to slow down the electrode as it approaches the work and avoid hammering. Pressure may be applied by adjustable spring or air lock, or straight air pressure may be used. Lower arm may be column or apron mounted or a lower knee and flat upper terminal may be used. Interchangeability of these parts makes it possible to adapt this welding press to a wide variety of spot and projection welding operations.

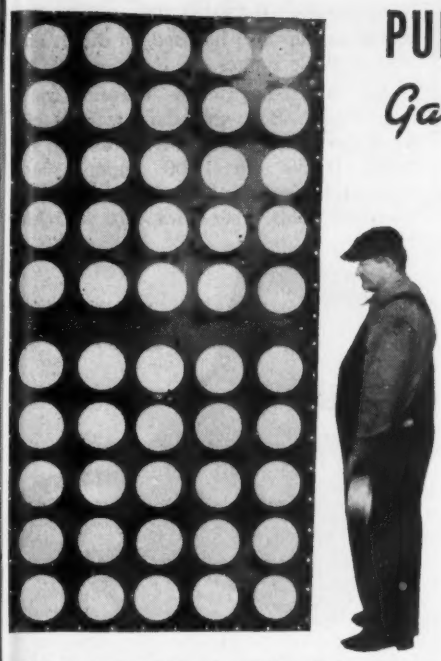
Voltammeter

Simultaneous readings of current and voltage may be taken with the new voltammeter, Model 601, introduced by Associated Research, 231 South Green street, Chicago 7. Contained in the case of this instrument are an alternating current voltmeter and ammeter.

The ammeter measures from 0.2 to 550 amp in eight current ranges: 0-1, 0-5, 0-10, 0-25, 0-50, 0-100, 0-250, 0-500. The voltmeter measures from 30 to 600 v in

PUNCHES 5" TO 8" HOLES 25 TIMES FASTER

Gang-Punches 25 Bolt Holes Per Stroke



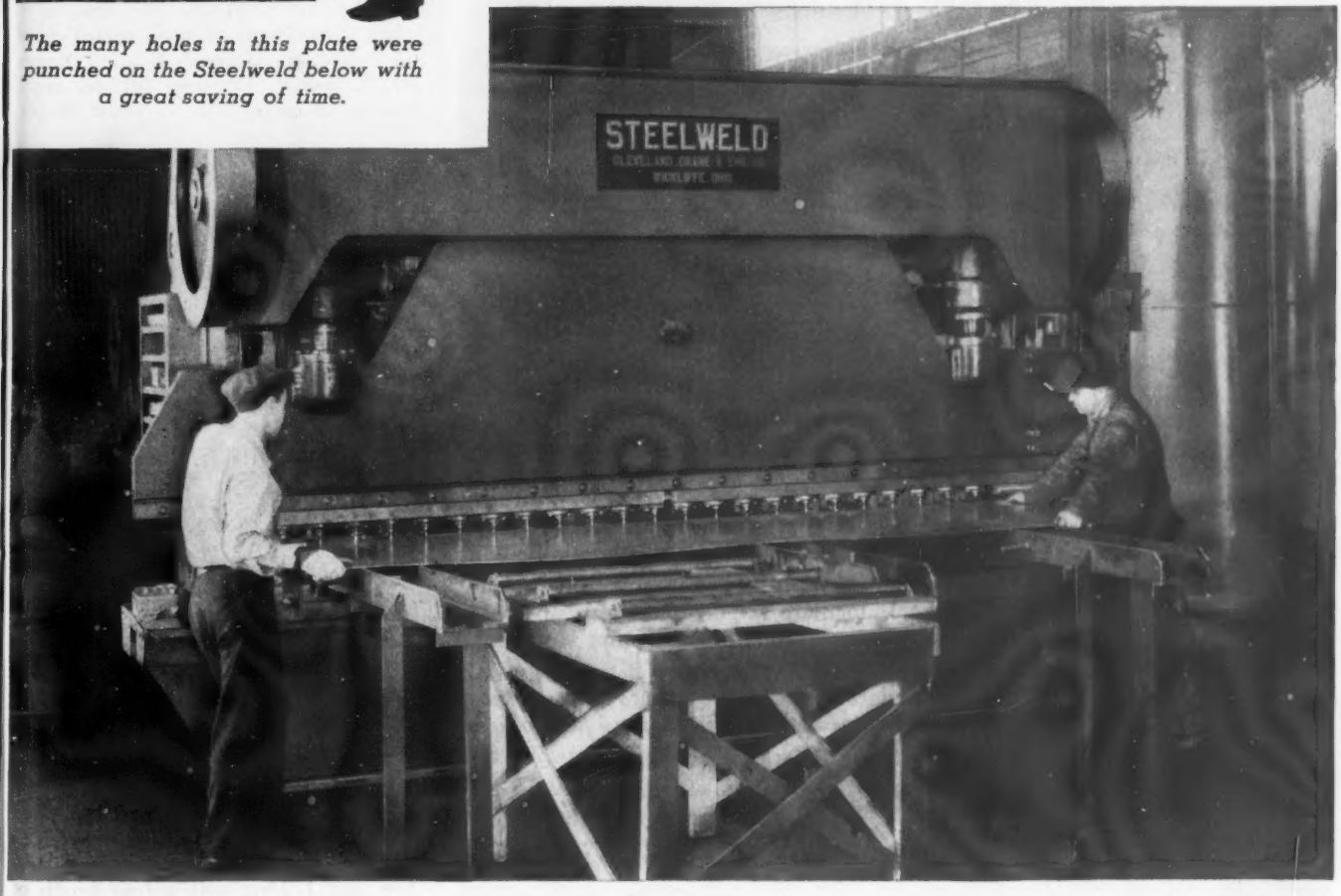
The many holes in this plate were punched on the Steelweld below with a great saving of time.

Steelweld Presses are versatile tools that can be adapted to many kinds of work by simply changing the dies. The same press that bends and forms plate can be set up to punch holes in a few minutes.

In the plate of a dust collector manufacturer, a Steelweld punches 5" to 8" holes singly in 10-gauge and 12-gauge plate, 25 times faster than formerly. The same press multi-punches 25 and more bolt holes at a time. It also bends, flanges and performs other forming operations.

In a furnace factory 30 rivet holes are gang-punched per stroke in 3/16" steel. The Steelweld here also performs all necessary braking and forming operations.

If you work with plate in any thickness up to one inch, it's to your advantage to have the facts on Steelweld Presses.



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Important Production Economies with Bearing Bronzes in This New Form

No costly scrap — certain yields — faster production on screw machines

with Ampcoloy continuous cast bronze rods

For the first time, certain bronze alloys — previously available only as sand, permanent mold, or centrifugal castings — are now produced in 10 foot lengths by a continuous casting process, exclusive with Ampco in the cast bronze field.

The comparative photomicrographs (tin bronze) illustrate the tremendous improvement in quality. Also the materials are adaptable to fabrication on automatic screw machines, with big savings in time, manpower, and money. Sand-free surface—no internal segregation—uniform diameter and even length. Scrap loss due to metal faults practically eliminated.

Also available are high-lead bronze and other bearing bronzes. Immediate shipment on rods up to 2" in diameter. Tubes available for prompt shipment, in tin bronze only.

Write for data sheet 131. *Ampco Metal, Inc., Dept. S-7, Milwaukee 4, Wis. Ampco field offices in principal cities.*

Reg. U. S. Pat. Off.
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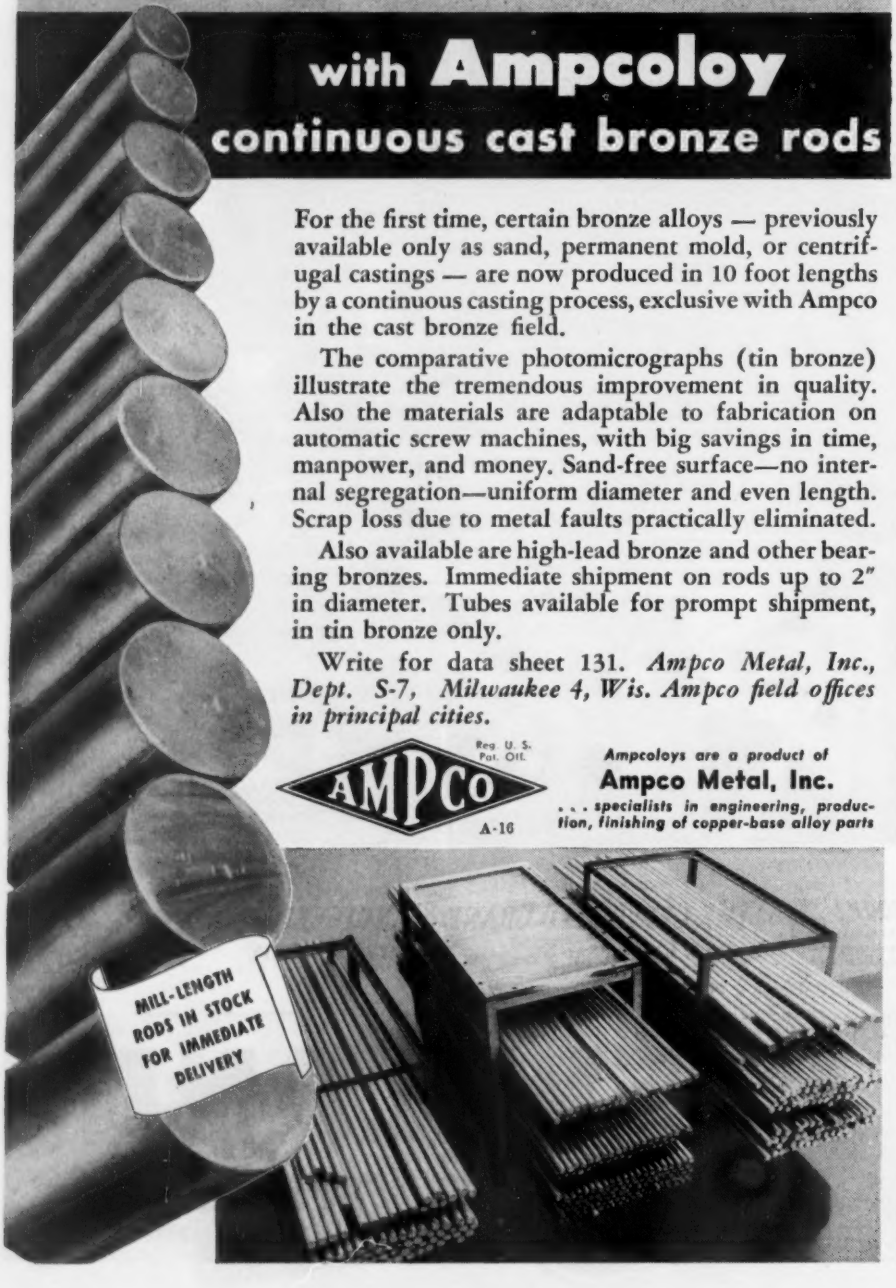
Ampcoloys are a product of
Ampco Metal, Inc.
. . . specialists in engineering, production, finishing of copper-base alloy parts



three ranges: 0-150, 0-300, 0-600. The voltmeter can also be used on direct current at these ranges.

An inserted primary current transformer with 8 ft secondary leads facilitates the measurement of current on the 0-100, 0-250 and 0-500 ampere scales without subjecting the meter to the stray magnetic fields. User can locate the meter

where it can easily be read, regardless of the current transformer's location. Range selector switch on panel permits quick reading of currents in all eight ranges.

Rubber Tired Wheel

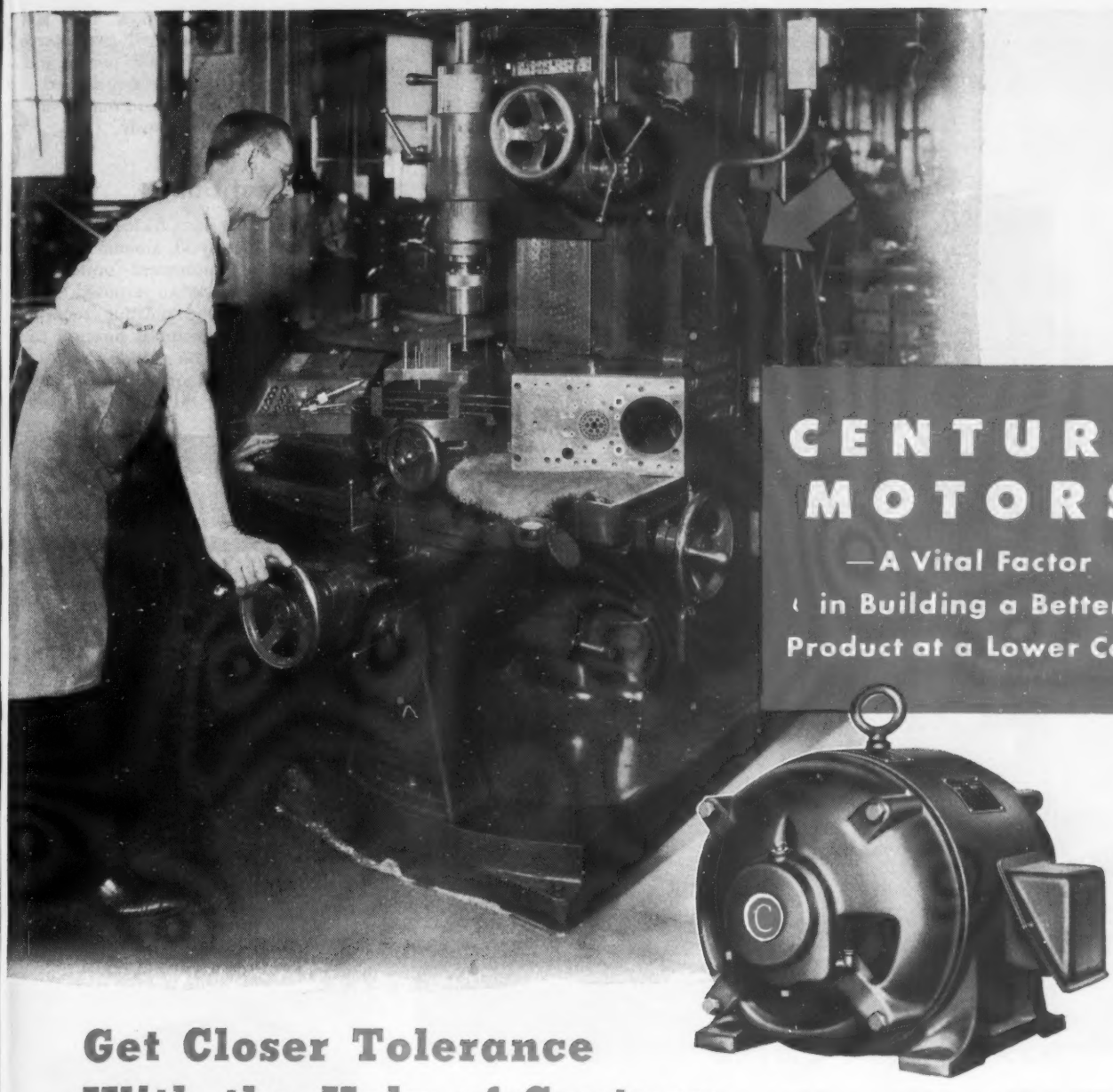
Designed for use on materials handling equipment requiring more capacity than ordinary type of wheel will permit, a new air wheel with large demountable, cushion-type roller bearing tires is announced by Rapids-Standard Co. Inc., Grand Rapids 2, Mich.

The AGH wheel is available with a

6-in. diameter by 2-in. face. Equipped with roller bearings for free, easy, rolling, and available in axle sizes of 3/4, 5/8, and 1/2-in., with a hub length of 2 3/16 in., the wheel has a capacity of approximately 250 lb per wheel. It is held in place by two locking hub plates of magnesium, which places the tread of the wheel under tension.

Air Cleaner Test Unit

Donaldson Co. Inc., St. Paul, Minn., has developed a new mobile air cleaner field test unit This unit can be pulled on its two-wheeled chassis behind any passenger car. For purposes of duplicating working conditions in the field it can be drawn behind the tractor or other machine, or it can be parked adjacent to



Get Closer Tolerance With the Help of Century Motors' Unusual Freedom from Vibration

The Century Motor on the jig boring machine shown above is inside and out of sight and forgotten for many days at a time, but it is a vital factor in holding tolerances to ± .0002" on tools, jigs, and fixtures. These Century Motors start, come up to speed, and run quietly and smoothly.

Century Motors' unusual freedom from vibration contributes to the precision work demanded of tool room machinery.

Whether for the tool room or the production shop, there is a Century Motor to meet any machine tool and practically any other application. There is a wide range of types and sizes to meet the power demands and to provide protection against the surrounding atmospheric conditions.

They are offered in almost any combination of horsepower ratings and frames from 1/20 to 600 horsepower.

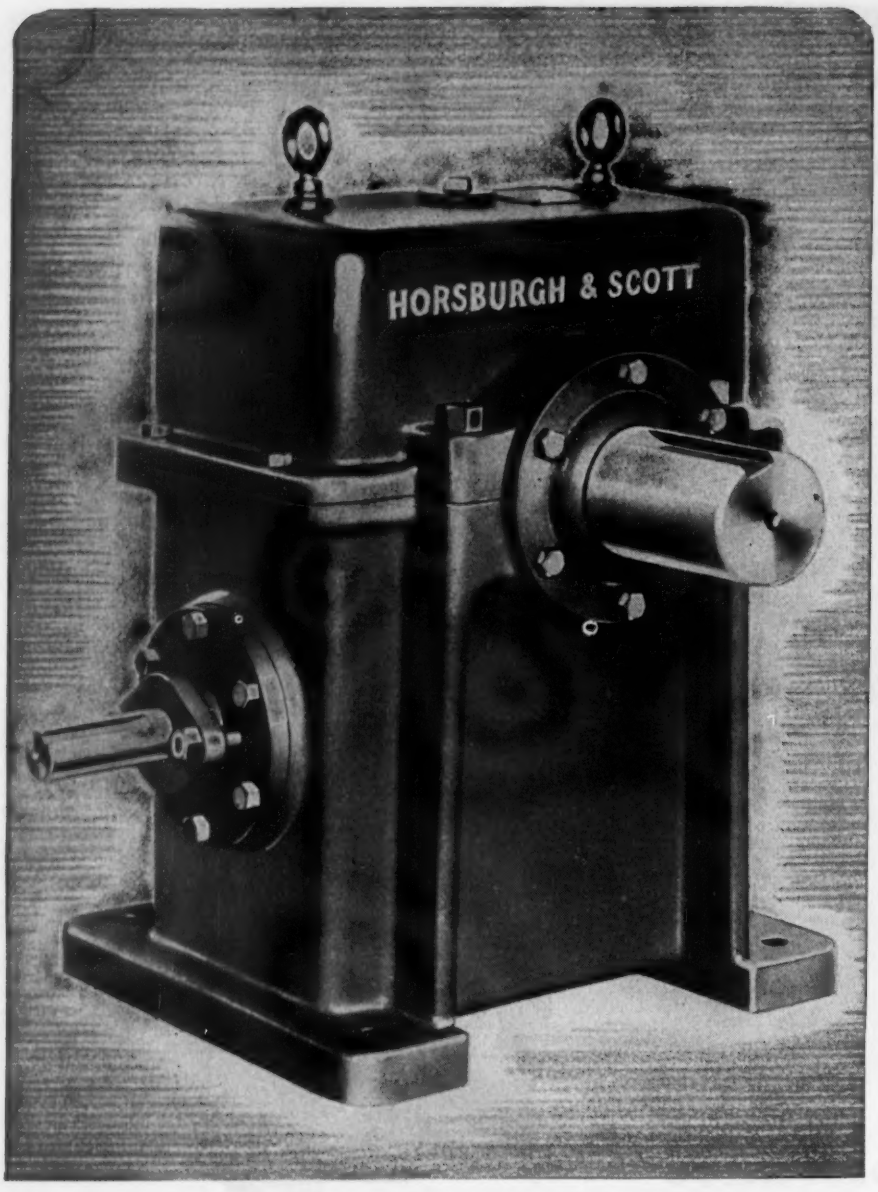
Specify Century Motors on all your electrically powered equipment. Engineered to the functional characteristics of the machines they drive to assure top performance—Century Motors are a vital factor in building a better product at a lower cost.

425

Century C MOTORS

CENTURY ELECTRIC COMPANY • 1806 Pine Street • St. Louis 3, Missouri

Offices and Stock Points in Principal Cities



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THE HORSBURGH & SCOTT CO.

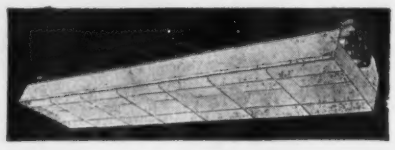
GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE • CLEVELAND, OHIO, U. S. A.

stationary units in operation. It is self-contained and equipped with two internal combustion engines which power individual blowers to provide the desired air flow for testing purposes. Four clear can be tested simultaneously.

Fluorescent Unit

Curtis Lighting Inc., 6135 West Sixty-fifth street, Chicago 38, announces a new type industrial fluorescent unit which can also be used as an exposed troffer in factory office and drafting room installation. The reflector is finished wit white Fluracite both inside and out. It is available with or without louvers. Primary purpose of this unit is to illumi-



nate areas where long, continuous lines are to be used as over benches where precision work is to be done. Louver are of substantial all steel constructio and provide 25 degrees crosswise an 15 degrees lengthwise shielding. They are supported at four points and may b swung down for maintenance. These units can be hung individually or i continuous lines by chain, conduit cable.

Foundry Flasks

Heavy duty, welded steel found. flasks are introduced by Algoma Proc ucts, 3080 East Outer drive, Detroit 12. Fabricated from hot-rolled steel, these

flasks are heat treated after welding to normalize construction and to insure equal stress. They are designed to be installed with straight or cut-to-pattern flash bars according to specifications.

Electrode Holder

A new armor clad, screw type, fully insulated electrode holder is announced by Electric Welding Division of General Electric Co., Schenectady, N. Y. The head of the holder is completely enclosed in a sheath of aluminum armor which protects the insulation, resists weld spatter and eliminates possibility of accidental contact with welding circuit.

Designed to accommodate electrodes up to and including ¼-in. in diameter,

This Statement We Know to be True . . . ON ANY FULLY AUTOMATIC MACHINE TOOL, PERFECTED LUBEWELL CUTTING COMPOUND WILL OUT-PERFORM ANY CUTTING OIL OR WATER SOLUBLE LUBRICANT REGARDLESS OF THE TYPE OF WORK BEING PERFORMED.

Prove this statement at our risk. G. Whitfield Richards will send you any quantity of Perfected Lubewell for use on any automatic machine tool.—If you find that it doesn't 1. increase tool life up to 50%; 2. increase production speed of the machine up to 25%; 3. give a superior finish and hold to closer tolerances; 4. lower cutting lubricant cost as much as 40% . . . you may tear up the bill. Better performance from coast to coast at 3 to 9 cents per gallon in the machine. Write, phone or wire for your trial order today.

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3,286,212 TURNER PLUG GAUGES

. . . are hitting the target!

We don't know how many plug gauges laid end to end it would require to reach Tokyo, but we do know that we made 3,286,212 steel and chrome plug gauges to check many types of war implements that do reach our military objectives.

Yes, *precision* has become the watchword of industry during this war, and it will continue to be a factor in those industries that will be the leaders in peacetime production.

★ Remember the name Turner when you think of Precision.

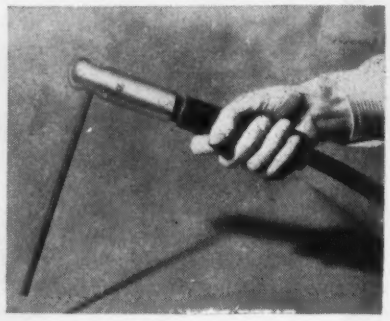
TURNER BROTHERS

TURNER GAUGE GRINDING COMPANY
2625 HILTON ROAD • • • • FERNDALE, MICH.

Types of Gauges we make

Cylindrical Plug Gauges, Plast-O-Lock Plug Gauges, Cylindrical Ring Gauges, Special Flush Pin Gauges, Solid Type Snap Gauges, Master Discs, Built Up Gauges

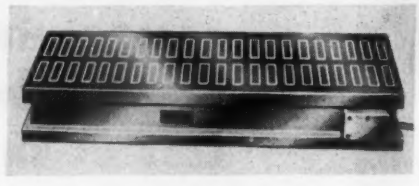
the device is light in weight and cool in operation. While in use, holder firmly grips electrode at proper angle and good current contact is maintained. This



keeps holder cool, tends to prevent overheating of electrode and maintains a uniform melting rate down to stub end. Threads of push-up rod do not carry current. A soldered cable connection also helps holder to remain cool. Width of electrode slot limits size of electrode which can be inserted, thereby preventing overloading.

Electromagnetic Chuck

Hanchett Mfg. Co., Big Rapids, Mich., is marketing a new type of electromagnetic chuck featuring a patented Hermeti-Coil which is waterproof and shockproof. Coils are sealed in completely airtight plastic cases. Lead wires are carried from each coil through airtight plastic containers, making each coil



a self-contained unit. The face plate is attached separately, therefore if face of chuck becomes worn, it may be replaced as a unit.

Chucks are designed to withstand external pressures, especially where coolants, water or oil are used. They are made from low carbon steel and are available in rotary, rectangular, revolving and other styles.

Pump

Designated as the Flowmaster, the new pump offered by Marco Co. Inc., Wilmington 17, Del., will transfer, meter or proportion material. It maintains nonpulsating delivery, positive displacement, high vacuum, no churning and no foaming. Any liquid, light or heavy and viscous, that is subject to pumping can be handled by this precision-built unit. It can be disassembled, cleaned and reassembled quickly.

Seals employed are of the single gland type, housed in stainless steel casing. They require no adjusting and may be removed for cleaning. Standard pumps are built in capacities for all standard ranges.

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SIMONDS "Red End" HACKSAW BLADES

THESE rugged "Red End" Blades for power-machine use are made to take the toughest service, *and to keep on taking it.* Smoother, straighter cutting . . . higher production . . . longer blade life . . . all these *extras* are now possible through Simonds 100% quality-control, and through Simonds new scientific method of tensioning power hacksaw blades to each particular job on which they are used. "Red End" Blades are made from Simonds own special electric steel, either standard, molybdenum, or high-speed. Order from your dealer *now.*

SEE SIMONDS NEW SOUND FILM, 16 mm in full color, showing how to choose the right "Red End" Blade for each job, and how to get the most out of it *on the job.* Have your dealer arrange to show it to *your* operators, in your own shop, without cost or obligation.

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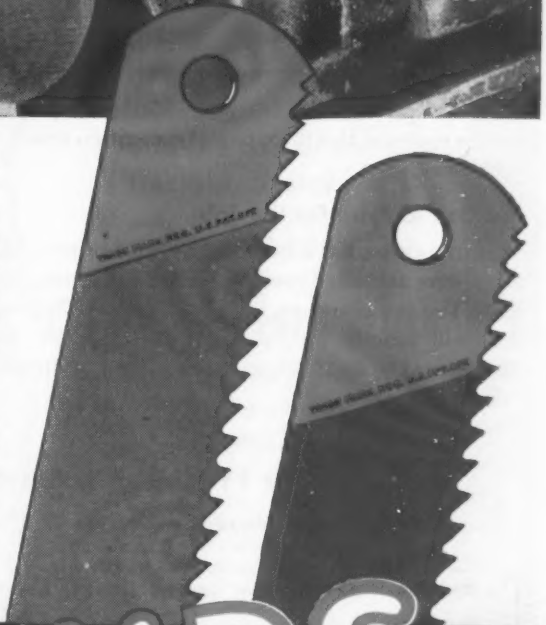


PRODUCTION TOOLS FOR CUTTING METAL, WOOD, PAPER, PLASTICS

SIMONDS SAW AND STEEL CO.
FITCHBURG, MASSACHUSETTS

CUT THE WAR SHORT . . . BUY WAR BONDS . . . AND THEN BUY MORE WAR BONDS

10 Different types of prints can be made with Ozalid

You specify the type of print desired—whenever you want reproductions of your engineering drawings, office forms, or other originals.

For some jobs, you may prefer a black-line print to a blue-line or red-line print. Or you may prefer the reproduction on cloth, instead of on paper, foil, or film.

Each type of print has its advantages.

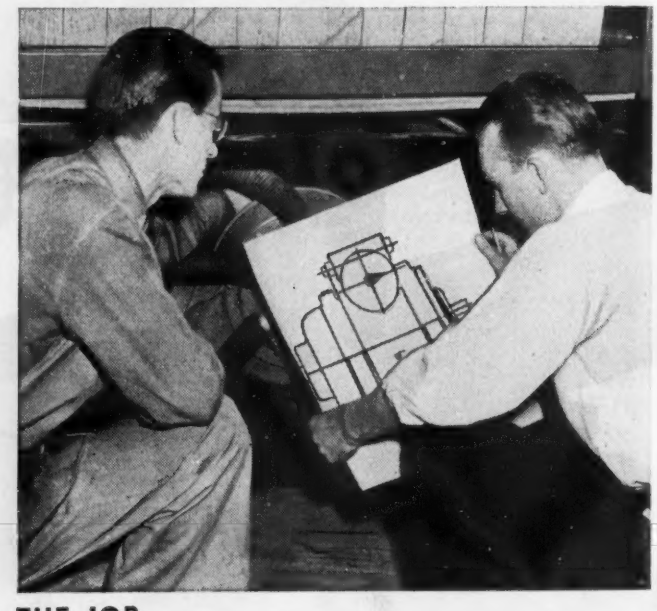
But no matter what type of print you choose, it's made in an OZALID MACHINE in the same manner, in seconds . . . for OZALID is a unique reproduction process which, besides giving you a 10-1 advantage, greatly simplifies printmaking.

THE JOB

Sixteen copies of this three page, typewritten report are needed right away.

The Ozalid Print for the Job

OZALID RAPID BLACK because you'll get prints which you will think were actually typed . . . and they'll be smudge-proof besides. You can also copy form letters . . . and type in headings that will exactly match the printed images. In addition, OZALID RAPID BLACK may be used for all-purpose work.



THE JOB

Part of this design must be changed before production can begin.

The Ozalid Print for the Job

OZALID TRANSPARENT CLOTH because an extremely durable "intermediate" print is desired. The obsolete lines on the print can be removed with Ozalid Corrector and the new design drawn in. The Transparent Cloth intermediate is then used to produce the desired number of prints for the production line.

THE 10 TYPES OF OZALID PRINTS

For efficiency in routine jobs • For "impossible" jobs

1. **Black-line**
2. **Blue-line**
3. **Red-line**
   For routine prints in drafting room, shop, or office.
4. **Opaque Cloth**
   For exceptionally durable prints, file copies, etc.
5. **Transblack Intermediate**
6. **Sepia-line Intermediate**
7. **Transparent Cloth**
   For producing "intermediate originals" or to save time and labor when making design changes.
8. **Transparent Foil**
   For making composite prints; reclaiming old, or worn originals.
9. **Chartfilm**
   For producing lustrous, black-line prints on white plastic base—oil proof and waterproof.
10. **Dryphoto**
    For high-quality reproductions of any photographic subject: in black, sepia, or two-tone effect.

Write for Free Samples of Ozalid's Ten Types and complete information.

Write **OZALID**

Division of General Aniline and Film Corporation Johnson City, N. Y. Ozalid in Canada—Hughes-Owens Co., Ltd., Montreal.

Improved Quenching

(*Concluded from Page 91*)

obtained and reduction or complete elimination of rejections and retreatment is effected. The high efficiency and precision of the operation make it possible to obtain desired physicals from steels having chemical analyses on the low side of the specifications while at the same time steels on the high side can be treated with little danger of cracking or excessive warpage.

These features are of paramount importance to the operator as they all contribute to more savings in production costs. The improvements in toughness, machinability, and physicals result in a superior product, and yet this is all obtained with very little, if any, additional expense or labor. It is important to control all steps of the process so that they are as near to being completely automatic as possible, for this assures more consistently uniform treatment and less chance of the occurrence of human error.

ACKNOWLEDGEMENT

The authors wish to thank the Carnegie-Illinois Steel Corp. for permission to use the experimental data and photomicrographs in this article.

Rust Inhibitor Protects Ferrous Alloys

Rust inhibitor No. 303, manufactured by Plasteel Corp., 3900 West Jefferson avenue, Ecorse 18, Mich., protects ferrous alloys from atmospheric moisture and chemical vapors between machining and drawing operations. Two to 3 oz of compound in powder form are mixed with each gallon of water. Solution usually is applied in a pickling or washing machine as last rinse before drying. Application at a temperature of 160 to 200° F is recommended for best results. Material is said to provide protection against humid or acidic atmospheres during processing and temporary storage indoors, but is not intended for stock exposed to weather. Compound, used instead of vaselines and greases on finished surfaces, offers advantage of a dry, clean and nearly invisible coating. It is said to have no detrimental effect upon brass and steel, and is removable from surfaces by a water rinse.

—o—

A new car has been added to the line of haulage equipment by Phillips Mine and Mill Supply Co., 2207 Jane, Pittsburgh 3. A hand push model, the Junior Phil-Dump has a ½-cu yd capacity and is equipped with solid rubber tires only. Its overall dimensions are 66 in. long, 38½ in. high and 24¼ in. wide.

A bulletin offered by this company also includes descriptions of tractor models and skid dump buckets.

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One GOOD INVESTMENT PROMOTES another
CLARKAT
2,000 to 2,600 lb. D.B.P.
CLARKTOR-6
2,100 to 5,000 lb. D.B.P.
CLARK ELECTRIC FORK TRUCK
1,000 to 7,000 lb. capacity
Cited for extraordinary usefulness and efficiency beyond the call of duty—the flexible, tireless
Pallet and
CLARK fork truck
the extraordinary pair that speeds the flow of munitions, food and supplies to the point of use.
To see the wide range of usefulness of Clark Tructractors and Fork Trucks, send for handy 72-page pocket catalog—describes 60 husky, well engineered vehicles, gas and electric powered.
Another PRODUCT of CLARK EQUIPMENT COMPANY
CLARK TRUCTRACTOR
BATTLE CREEK, MICHIGAN, U.S.A.
Products of CLARK • TRANSMISSIONS • ELECTRIC STEEL CASTINGS
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Rockrite rolled tubing

brings big benefits to

MANAGEMENT EXECUTIVES

PRODUCT DESIGNERS

PRODUCTION EXECUTIVES

SALES MANAGERS

ULTIMATE USERS

THE ROCKRITE PROCESS of sizing seamless tubing differs radically from the customary cold-draw method. This new process is a combination of compression, cold forging and extrusion that sizes tubing more accurately—with greater concentricity and less ovality, and to tolerances that are half or less than half those of ordinary cold-sized tubing. Rockrite Tubing is supplied in straight and tapered styles in ferrous, nonferrous and telescoped bi-metal combinations.

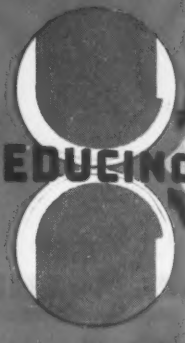
THE MANAGEMENT EXECUTIVE secures savings in manufacturing costs, speedier deliveries, product improvement. For parts can be made from Rockrite Rolled Tubing at high cutting speeds, can often be finished inside and out with one-operation forming tools—sometimes without machining.

THE PRODUCT DESIGNER finds a material of new, revolutionary possibilities for short-cut production of accurate cylindrical or ring-shaped parts—sleeves, ferrules, bearing races, bushings, spacers, etc.—in a variety of metals and bi-metal combinations.

THE PRODUCTION EXECUTIVE gets new operating economies, greater output per machine, reduction in number of operations required and fewer rejections.

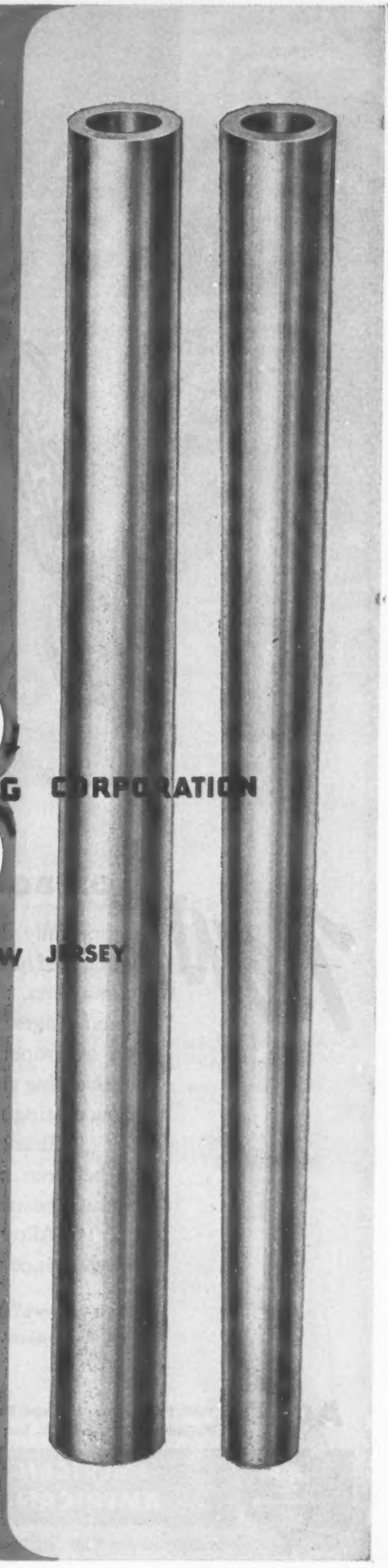
THE SALES MANAGER has a product that looks better, performs better, sells better—a completely modern product that can outdistance competition on merit—plus lower price.

THE ULTIMATE USER benefits by getting equipment of precision quality, up-to-the-minute design and manufacture, and definitely better value for his money.



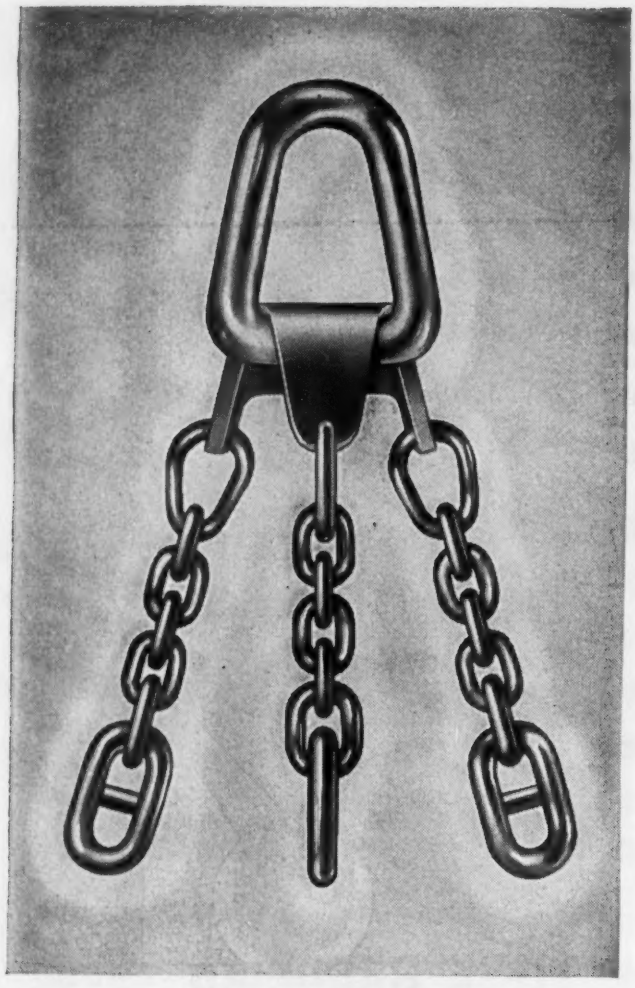
TUBE REDUCING CORPORATION

WALLINGTON, NEW JERSEY



VALUABLE, TIMELY DATA

Send for our 20-page book of vital information on seamless tubing. Tables give accurate comparison of conventional tubing tolerances with those of Rockrite Rolled Tubing. Full description of Rockrite process. Invaluable for product designers, production men, sales managers. Write for your free copy of "Rockrite Close Tolerance Tubing".



NEW!

OX BOW MAGNET CHAIN

Specially designed to take the punishment of handling materials with electromagnets, this new chain has the following advantages: (1) Cast Steel Yoke supports chain at proper angle, avoids twisting; (2) Large bearing surface between large link and ox bow casting reduces bearing pressure and wear; (3) Short chain links and small clearance between couplings and castings tend to reduce peening and battering of connections; (4) Alloy heat treated chain is hardened to reduce wear.

● *Made to any dimensional specifications in three-leg design, for capacities up to 30 tons.*

ACCO

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AMERICAN CHAIN DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

Brazing With Induction Hect

(*Continued from Page* 95)

the joint, and allow a small excess. These rings need not always be inserted in grooves but can be placed on top of the members right at the joint. The insertion of sheet from 0.003 to 0.010-in. in thickness into the joint gives good results when joining members with lap, scarf or butt joints.

Washers can be made from thin sheets and used as inserts for joining flanges, spuds and similar type fittings to tanks and other articles. While washers, when blanked from sheet, are more expensive than rings, at the present time there are methods being developed for coining rings and spirally winding strip to make washers so that they will be on a more nearly equal cost basis with rings.

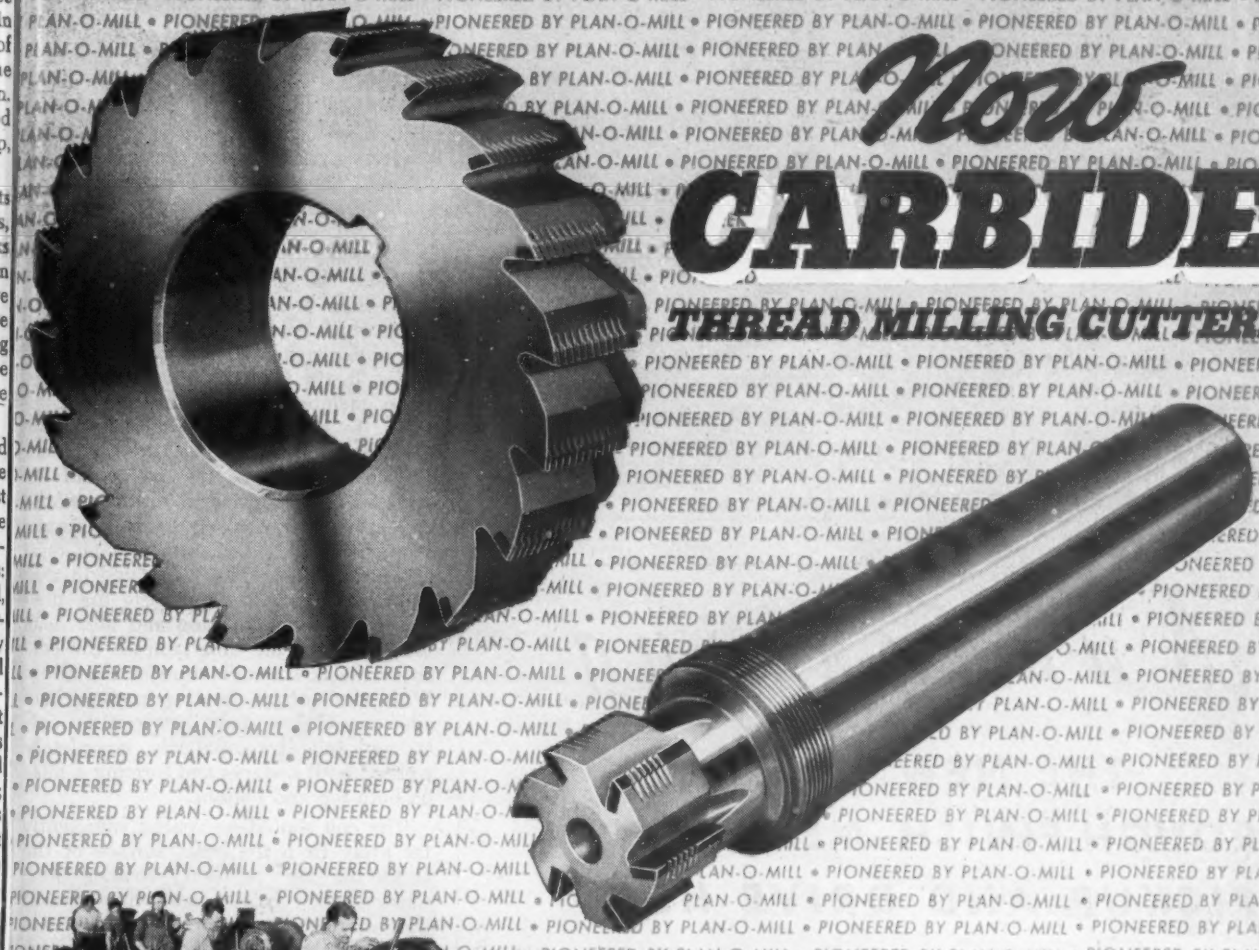
When induction heating is employed for making a silver-brazed joint, the use of preplaced rings and inserts is almost always necessary. Fortunately, there are a number of advantages to this preplacement of alloy technique such as: (1) Control of amount of alloy used, thus eliminating waste; (2) better assurance that the alloy will be properly distributed over the joint surfaces and all parts will be wetted; (3) the appearance of the alloy at the edge of the joint is a good indicator that the joint has been heated sufficiently to insure a good bond and this aids visual inspection; (4) it is possible to make up assemblies having a large number of joints that can be heated at the same time; (5) the workman can devote his entire attention to applying a uniform heat to the joint, the danger of overheating being minimized because the alloy melts when the proper temperature is reached; (6) the operations of applying the alloy and heating the joint are so divided that they can be incorporated easily in straight-line, high-speed production.

Factors to be considered in the preparation of a silver-brazed joint include cleaning, fluxing, assembly and jigging, heating and subsequent cleaning of the joint. Each one of these factors is equally important in making a good brazed joint.

Assuming that a suitable source for producing high frequency electrical energy is available, it then becomes necessary to design a conductor arrangement which will give the proper heat-producing magnetic field confined to the joint area of the parts being brazed. The customary form of these conductors is a coil (usually hollow copper tubing to permit circulation of water for cooling) either single or multiturn, depending on the magnetic field requirements desired for the particular application. Since field strength depends upon the current in a single conductor, its magnitude is amplified by the use of a multiturn coil, each turn acting as an individual conductor. Fig. 2 shows the patterns of the magnetic fields surrounding both single and multiturn coils, with no metallic material in the coil.

The important rule to remember, and

Now CARBIDE THREAD MILLING CUTTERS



5

FIRSTS BY PLAN-O-MILL

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- First planetary to mill external threads with standard multiple thread cutter!
- First planetary to coordinate feeds and speeds!
- First to provide absolute control of feed-in!
- First to offer a practical, low cost carbide thread milling cutter!

Attractive deliveries can be made on Planco High-Speed Steel Thread and Form Milling Cutters.

Now, to the proven speed and accuracy of thread milling, Plan-O-Mill brings you the proven *extra* advantage of cemented carbide. This tough, wear resistant material, forming the cutting edges of Planco Carbide Thread Milling Cutters, gives you greater accuracy, greater speed, and many more parts per grind. No tooling change is necessary.

Planco Carbide Thread Milling Cutters are available in National, Whitworth, Acme, V, and special forms, with or without provision for the Higbee cut. Both shank and shell type cutters are offered.

For increased production with maximum savings in time, money, and manpower — tool up today with Planco Carbide Thread Milling Cutters!

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HAZEL PARK, MICH.

THREAD AND FORM PLAN-O-MILL MILLING MACHINES

THREAD AND FORM PLAN-CO MILLING CUTTERS

Announcing

THE NEW BRUSH ROUGH-FINISH MEASURING PICKUP AND DRIVE HEAD

A perfect complement for the Brush Surface Analyzer is the new Rough-Finish Measuring Head. Developed to meet the growing need for the checking of rougher surface finishes and waviness, it accurately measures irregularities from 100 to 3,000 microinches, peak to valley.

This new Pickup (Model BL-101) and Drive Head (Model BL-102), when used with the Brush Surface Analyzer, extend its usefulness and range of measurement from 1 to 3,000 microinches.

Write today for descriptive literature.

THE BRUSH DEVELOPMENT COMPANY

3326 PERKINS AVENUE CLEVELAND 14, OHIO

particularly so with induction heating, is that in making a good brazed joint, one having high strength and leak-tightness, it is necessary that all surfaces to which the alloy is to adhere must be heated above the flow point of the alloy. In a sleeve type of joint it is possible to heat one surface, causing the alloy to flow and adhere to it, but not to the adjacent surface because it is cold, thereby chilling the alloy and thus preventing wetting. Therefore, the induction coil should be designed to heat the joint area of all parts as evenly and uniformly as possible.

Where the joint is designed with a large shear area, such as the collar on tubes which is similar to the joint design of many shell burster castings shown in Fig. 3, the heat may be put into the outer member and the inner section heated by conduction. This demands a tight fit between the parts as explained previously. The heating coil would be designed to be concentric with the work, and cause the collar to be in a strong magnetic field and consequently be rapidly heated. The heat generated in this outer collar would then melt the preplaced brazing alloy ring and also heat the surface of the tube beneath the collar to the flow temperature of the alloy. With the correct heating pattern, the alloy would flow down between the collar and tube by capillarity, completely wetting both surfaces and forming a fillet on both top and bottom.

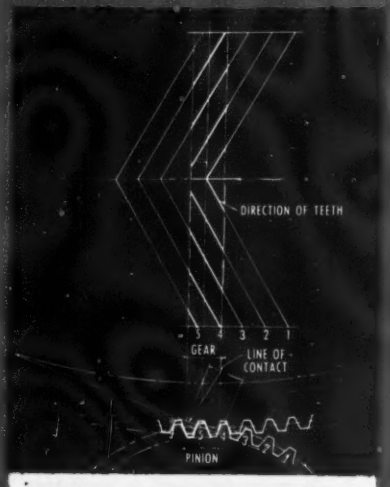
The coil should be spaced sufficiently far away from the outer surface of the collar to give a slow, soaking heat rather than a surface heat which would produce such a temperature gradient across the collar as to cause overheating of the outer surface before the inner surface had been brought up to brazing temperature. A great number of brazing operations fall into the general classification just described; that is, when one member is heated by induction and the other member by conduction from the former.

Multiple Coils: The other general category for brazing operations is one where both members must be heated simultaneously by one or more coils. An example of this type would be a stud brazed into a hole in a flat plate which is similar to the brazing of adapters to nose pieces of certain chemical bombs as shown in Fig. 4. Here the heating coil is designed to produce a magnetic flux pattern which will cut both pieces and so heat them both. Here, again, the brazing alloy is preplaced around the base of the stud and upon the surface of the plate. When the joint area reaches the proper temperature, the alloy melts and flows in to make the joint. In some cases it might be advisable to place the alloy underneath the stud surface and maintain pressure on the top of the stud during the heating cycle. Upon melting of the alloy, this pressure would cause the stud to fall into place and force out any excess alloy, thereby permitting a clearance to give maximum strength. Coil adjustment and location in this type of joint are important since

WHAT YARDSTICK DO YOU USE IN SELECTING GEARS?

FARREL

THE GEAR WITH A BACKBONE



The lines of contact are oblique across the face of the teeth, and the pressure is evenly distributed over each tooth from tip to working depth line, so there is no tendency for the teeth to wear unevenly.

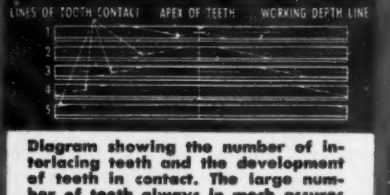


Diagram showing the number of interlacing teeth and the development of teeth in contact. The large number of teeth always in mesh assures uniform angular velocity.

On any basis of selection, the advantages of Farrel-Sykes continuous tooth herringbone gears — *The Gear with a Backbone* — merit the consideration of designers and engineers responsible for the correct application of gears and their successful operation.

The *backbone,* formed by the juncture of the two helices without a center groove, puts the entire face width to work and provides extra strength and higher load-carrying capacity in small space — a definite advantage for "designed-in" gears.

Precision generation by the famous Farrel-Sykes process makes these gears exceptionally quiet and smooth-running. The combined characteristics of overlap or interlacing of the teeth, creeping engagement and inclined line of pressure, reduce wear and maintain the involute profile and correct tooth action throughout a long gear life. Opposed helices balance and absorb axial thrust within the gear member, eliminating harmful thrust loads and resultant stresses on other parts of the machine.

These and other features of design and manufacture contribute to dependable performance, continuous operating efficiency and maintenance economy.

We shall be glad to have a Farrel engineer give you further details of the *Gear with a Backbone,* or send you a copy of a descriptive booklet, No. 438. No obligation.

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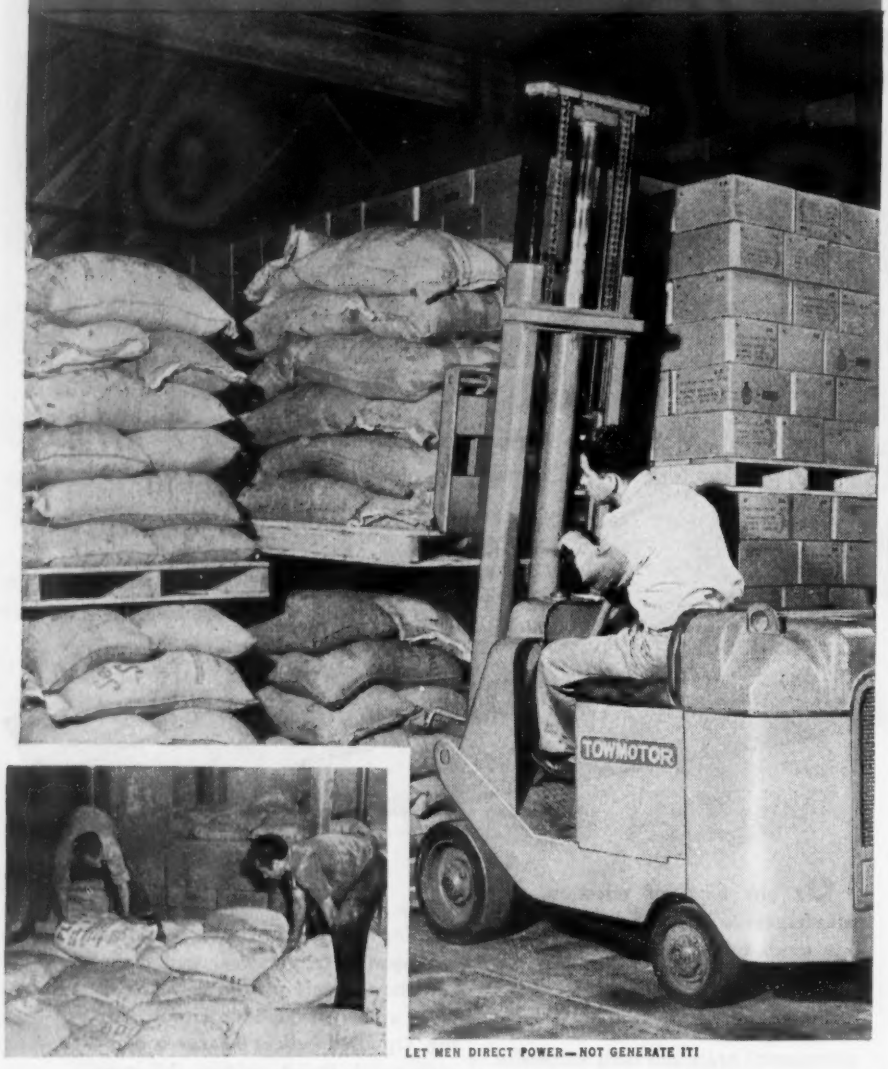

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the masses of the two pieces may vary considerably or perhaps be prepared from metals that have different specific heats.

Fig. 5 and 7 illustrates various designs of coils of both single and multiturn. The most common type is the round of the multiturn shown at A or the more rigid single inductor at B, Fig. 5. Various means of cooling the heavy single inductor are: (1) By attaching copper tubing to the outer edge as shown in cross-section x — x and D; and (2) by slotting the coil and attaching a thin section of copper to form a continuous channel for water passage as shown at C. The external coil has a concentrated magnetic field within it and is therefore very efficient for rapid heating. It should always be used if at all practical. The brazing of two telescoped tubes using an external type of coil is illustrated at E. Other variations of external coils are the rectangular, formed and spiral-helical shown at F, G and H, respectively, in Fig. 5, and, of course, are used to heat specially shaped parts.

The flat or pancake coil is illustrated at A in Fig. 7. It is used as shown at B, Fig. 7, where large flat areas are to be heated. Good contact between the two surfaces is necessary and in keeping with this the brazing alloy is preplaced in the form of sheet although a grove could be cut in one member to provide space for a ring. This type of coil is not as efficient as the external coil. The internal coil shown at C, Fig. 7, is used for the internal heating of tubes or cylindrical members particularly where it is impractical to place the coil around the parts as shown at D. This type of coil also is less efficient than the external coil.

Fig. 7,E, illustrates the path of the high frequency electric current in a multiple position inductor block type of coil. It is made of solid copper plate, bored to suit the diameter of the parts and slotted as shown. Fig. 7,F, shows a two-position coil prepared for cooling as shown in Fig. 5,C, and the use of this type of coil is discussed later in this article.

With the two above-mentioned categories of coil design for induction brazing, it is considered that the work is fixed with relation to its position in the coil. There are many instances where the coil design can be modified to adapt it to progressive heating. For example, a single turn or even a multiturn coil can be made oblong in shape, thus permitting the use of a conveyor belt arrangement. This is particularly suited for small parts where it would be extremely difficult to feed and load the induction generator to capacity. Also, it lends itself to a soaking heat which is almost always desirable for brazing.

Another type of continuous heating would be to move the work past a coil designed similar to Fig. 3. It could be designed for either inside or outside heating and by moving a long tube or cylinder through the coil, the entire length could be progressively heated to brazing temperature. A typical example

important

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SIZE AND THICKNESS CHART

TUBE DIAMETER	MAXIMUM WALL		MINIMUM WALL	
*O.D. SIZE	DECIMAL	GAUGE	DECIMAL	B.W. GAUGE
1/4"	.065"	16	.028"	22
3/8"	.065"	16	.028"	22
1/2"	.065"	16	.028"	22
5/8"	.065"	16	.028"	22
3/4"	.065"	16	.028"	22
7/8"	.065"	16	.028"	22
1"	.095"	13	.028"	22
1-1/8"	.083"	14	.028"	22
1-1/4"	.095"	13	.028"	22
1-3/8"	.095"	13	.028"	22
1-1/2"	.109"	12	.035"	20
1-5/8"	.120"	11	.035"	20
1-3/4"	.120"	11	.035"	20
1-7/8"	.120"	11	.035"	20
2"	.165"	8	.035"	20
2-1/4"	.180"	7	.035"	20
2-1/2"	.203"	6	.035"	20
2-3/4"	.203"	6	.035"	20
3"	.220"	5	.049"	18
3-1/4"	.220"	5	.049"	18
3-1/2"	.238"	4	.065"	16
3-3/4"	.238"	4	.065"	16
4"	.250"	3	.065"	16
4-1/4"	.250"	3	.065"	16
4-1/2"	.250"	3	.065"	16
4-3/4"	.250"	3	.065"	16
5-1/2"	.134"	10	.083"	14

*Intermediate sizes within the range indicated can also be manufactured. Please consult us for sizes not listed.

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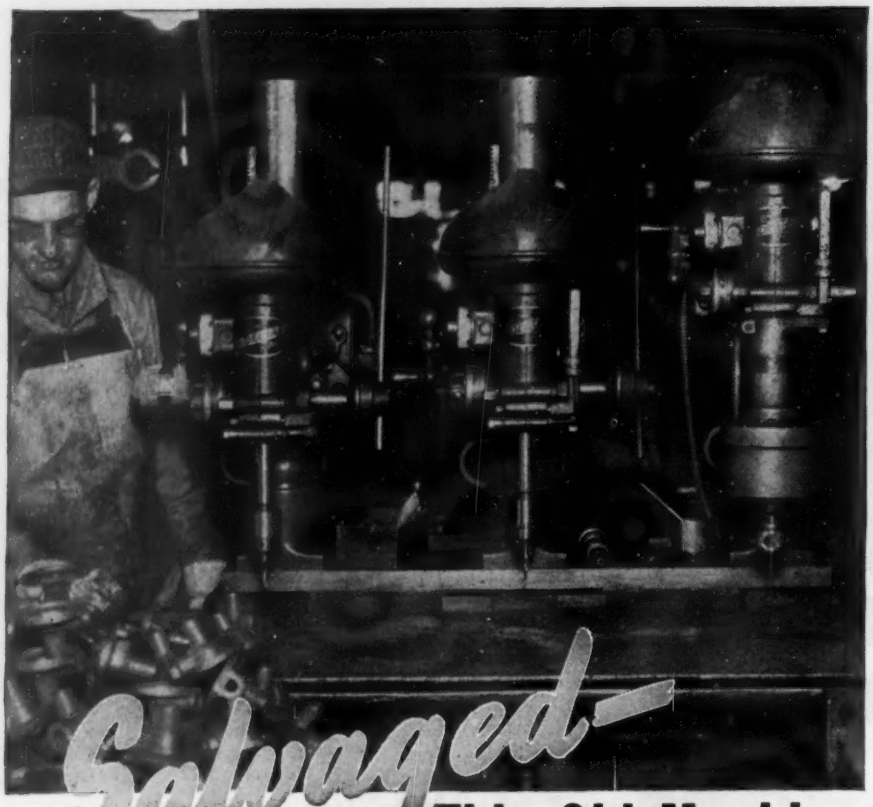

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by replacing worn-out assemblies with stock-model Delta units

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The original heads of the old machine were worn out to the point of having only junk value. These were replaced by three Delta 17" drill press heads mounted on the original base and table which were still in good condition. Thus, an obsolete machine was economically salvaged and production capacity increased.

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of this method would be the brazing of fins, either spirally wound or as individual disks, to the outside of steel cylinders. The brazing alloy would be placed in the form of wire between each fin and its neighbor and the induction coil would be centered inside the cylinder to heat, for example, only one-tenth of the finned length. When the proper brazing temperature is reached, the cylinder is then moved past the coil at such a rate as to progressively heat the entire length of cylinder to braze the fins in place.

Suitable mechanical arrangements are, of course, necessary to permit proper movement of parts with these special adaptations of coils. As a matter of fact, with induction heating special jigs and fixtures usually are required to position and hold the work in the coil. The elaborateness of these fixtures and mechanical devices will depend on the ingenuities available in the different plants as well as the requirements dictated largely by the demanded production. Where there is large-scale production, fixtures and mechanical devices are often advantageous for such operations as fluxing and cleaning.

Generally speaking, the specifications listed below should be followed in approaching a brazing problem using induction heating:

Determine whether the heat should be concentrated on one piece, allowed to flow by conduction to adjacent members or whether all pieces should be heated directly by induction.

Design the coil so as to subject the section to be heated to a strong alternating magnetic field.

Allow ample spacing between the heating coil and the work. This will permit the work to be placed into and removed from the coil with the least trouble and at the same time prevent overheating of surfaces very near the coil.

Design the coil so that the most energy is thrown into the piece of largest heat mass, thus allowing all parts to rise in temperature at the same rate.

Strive for the simplest heating coil which will give the correct results.

Although it is possible to use conveyor arrangements with induction heating, it has been found very practical to braze a number of pieces at one time, using multiposition coils. To overcome the condition of having the generator idle during loading and unloading periods, two coils, designated as stations, are usually employed. Both stations are identical and can be designed to heat one or more pieces as the conditions demand.

They are controlled by a single switch which can be readily thrown from one to the other so that when one station is heating the parts, the other station can be unloaded and reloaded. Hence, the number of pieces to be heated simultaneously is determined not only by the power available but also by the optimum number of pieces that can be handled during one heating cycle by the operator. Curiously enough, a time cycle of about

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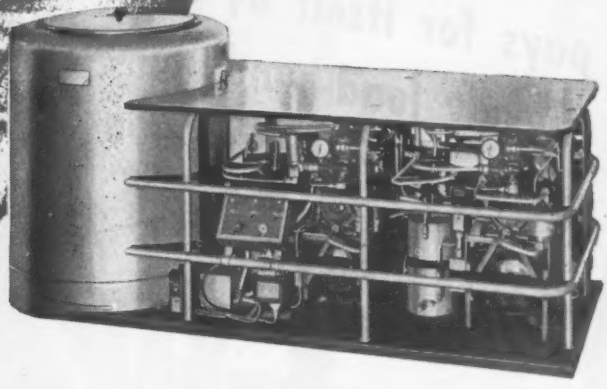
Records Submitted by *Deepfreeze* Users Establish Cold Treating as a Timesaving Aid to Low Cost, Quality Production



OPERATION	PART	PERFORMANCE PRIOR TO COLD TREATMENT	PERFORMANCE FOLLOWING COLD TREATMENT
HARDENING	High Speed Drill	48 holes per grind	256 holes per grind
	Tap	40 pieces per grind	500 pieces per grind
	Milling Cutter	7 hours per grind	24 hours per grind
STABILIZATION	Pump Plunger	Operation unsatisfactory due to metal growth.	Perfect operation indefinitely, due to complete stabilization.
	Gauge Blocks	Blocks expanded and warped.	Blocks held original size and shape.
	Lapping Flats	Resurfacing required every 2 to 3 hours.	Resurfacing required every 2 to 3 days.
SHRINK-FIT	Airplane Landing Struts	20 minutes required for assembly.	10 minutes required for assembly.
	Tapered Roller Bearing Race	½ hour to insert in casting.	½ minute to insert in casting.

These performance records are typical of economies obtained in many of the nation's leading industrial plants by the use of Cold Treating in various production processes—economies which can be duplicated under similar conditions in your plant.

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If you are unfamiliar with industrial Cold Treating or are using it on a limited scale and are interested in increasing its range of utility, contact Deepfreeze Engineering Service. Our experienced refrigerating engineers will make a complete study of your product and production setup and enumerate the possibilities and advantages of applying it on the broadest possible scale. This service will not obligate you in any way.

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60 sec has worked out to be best for the average brazing operation.

There are a number of advantages in using low-temperature silver brazing alloys and induction heating from the alloy point of view as well as the method of heating.

Simplicity of Operation: The operations are extremely simple, making it possible, therefore, to use unskilled operators. It is of decided advantage to have push-button control, particularly when many pieces are being produced. In addition, each joint is uniform whether one hundred or one million are made.

Low Cost: While the metal silver is relatively expensive and represents a definite percentage in the various silver brazing alloys, it has been proven that the actual cost of making a silver-brazed joint is very low. The primary reason for this is the fact that so little quantity of alloy is needed to make a satisfactory joint. The other operations such as cleaning after brazing, speed of operation, reliability, etc., are factors definitely favoring the low temperature silver brazing alloys. The cost to operate the induction generator is very low, too, usually running in the neighborhood of one-half cent or less per piece heated.

High Speed: Brazing by high frequency electric induction is inherently a fast operation, particularly when using the low-temperature, fast-flowing silver brazing alloys. For large-scale production this is of definite advantage.

Control of Heat: The heating of parts can be confined precisely to the joint area. That, of course, is a factor in the low cost and high speed of operation, but, in addition, there is very little or no cleaning of parts. Also, there is minimum annealing, a very important factor when high strength is a major consideration. Distortion which sometimes develops with other methods of heating can be reduced or entirely eliminated by induction heating.

The foregoing article is based upon data prepared by Mr. Setapen for presentation before a meeting of the Electrochemical Society.

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Wirebound crates, designed to carry transmissions weighing from 300 to 680 lb, clutches, universal joints, propeller shafts, axles and power take-offs, reduce weight of containers 40 per cent and handling charges 20 per cent, according to Wirebound Box Manufacturers Association, 43 East Ohio, Chicago 11. Relatively thin wood slats are held in position with sturdy binding wire to effect lighter weight and economical use of shipping space and lumber. Base is designed to hold either one or two transmissions suspended in a manner to prevent damage to any part. Outside wrap-around or mat—four panels of crate held together by wires—is placed around the unit. Closures are fastened easily and securely with little effort.

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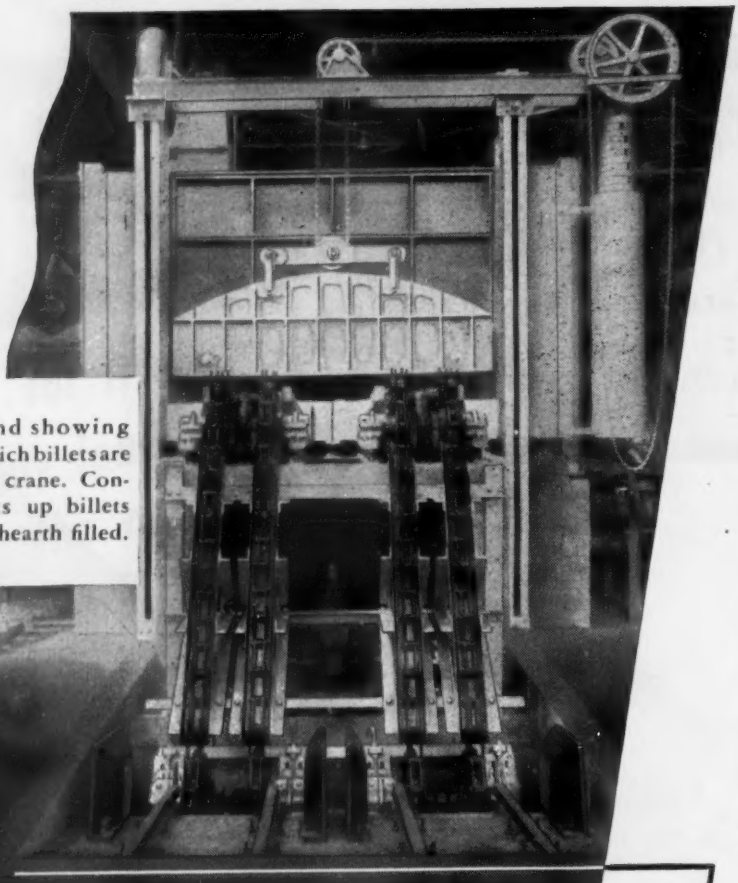

Charge end showing pit into which billets are placed by crane. Conveyor picks up billets and keeps hearth filled.

CONTINUOUS

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Plaster Mold Castings

(*Continued from Page* 98)

areas by passing the castings through a chamber where high pressure water streams play on the castings. At no time are the castings subjected to shot or sand blasting, which would impair the finish and fine detail characteristic of these castings.

From this point on, the castings are handled in the usual manner except that a minimum of cleaning operations are performed and only a slight amount of trimming of gates and parting lines is necessary before shipment.

Unique Pattern Construction: Fundamental to low cost and high accuracy is the unique cope and drag flask and pattern constuction. Patterns are made of brass and mounted on brass blocks known as strips. The strip size used may be any multiple of a standard basic "A" strip up to the capacity of the flask. These strips may readily be assembled or interchanged in the flask so as to use the mold efficiently for the maximum number of castings.

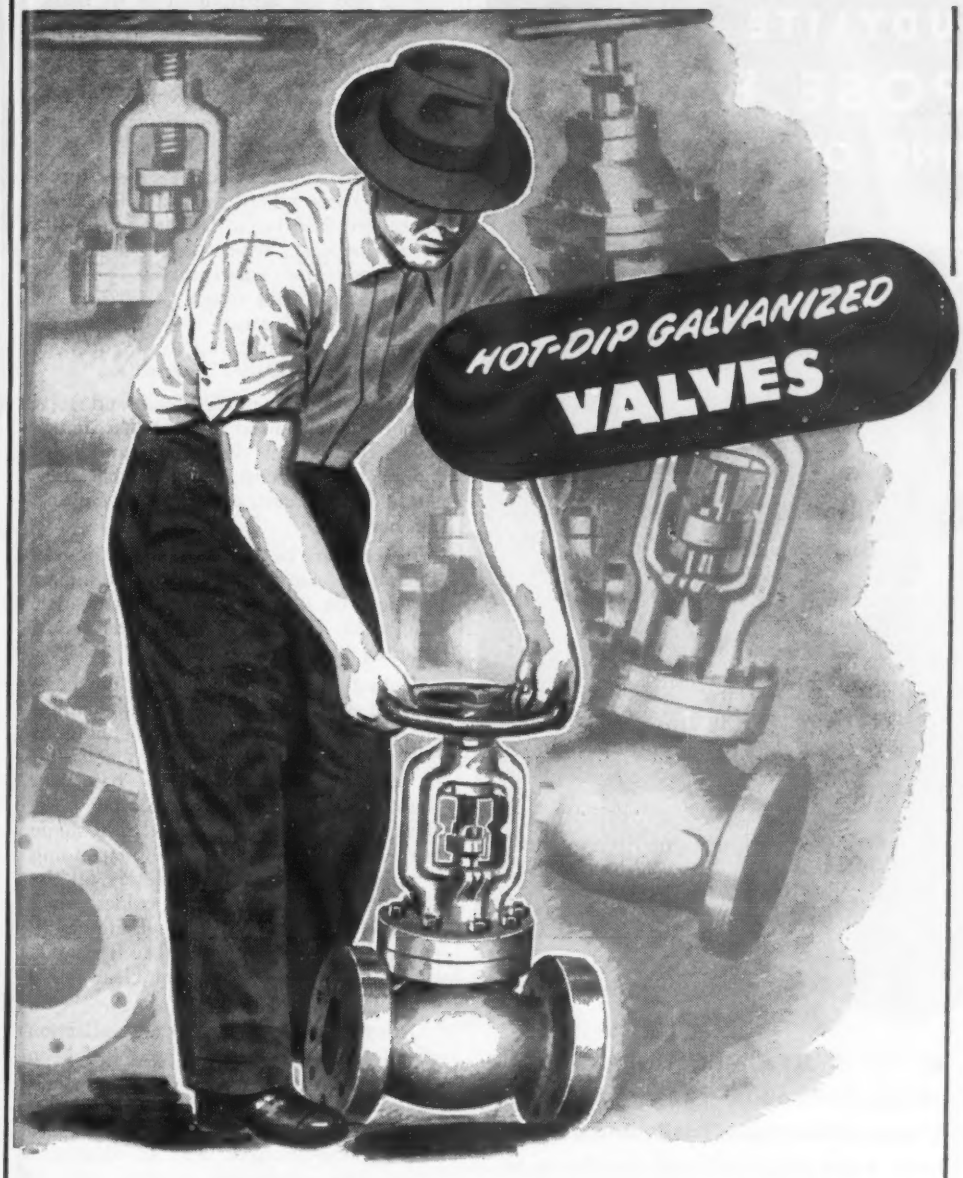
The flask is a semi-permanent assembly standardized for sprue post, main runner, dowel pins, locators, mounting plates and sides. The individual pattern strips are made with a permanent gating system designed for the particular pattern or multiple patterns mounted thereon. With this system, therefore, it is possible to make several different types of castings from one mold for a particular alloy cast in that mold. On several occasions, as many as 250 castings of 20 different designs have been produced from one mold. This flask system makes possible the production rate required with the combination of lowest piece price and minimum pattern expense. Normally, the production output of a single pattern impression is 1200 castings per month.

Standardization of the flask limits the size of castings to that which can be made in a mold 12 x 18 x 4 in. Castings have been made in this size mold weighing as much as 15 lb.

Casting Tolerances Divided: Casting tolerances involve consideration of many factors, not the least of which is cost of pattern construction. Part of the drawing tolerance to be met must be allotted to the pattern maker and some tolerance to be allowed in foundry operation. In most instances, where required, drawing tolerances of plus or minus 0.005 or 0.010-in. can be held.

Some consideration is also to be given to mold shift across the parting line, depending on the nature or design of the part. Also to be considered in drawing tolerances are draft angles. Outside surfaces normally have ½ degree draft angle and in some cases no draft at all. Inside surfaces require from ½ to 3 degrees draft. A further consideration in tolerances and pattern cost is that patterns are not subjected to wear or abuse. Some patterns have been in continuous use for several years.

Wall Thickness Kept Thin: The flatness of surface which can be achieved depends largely upon the shape of the



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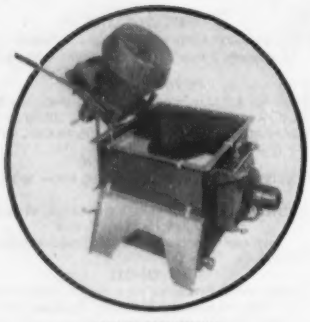
MULTIPURPOSE BARREL

FOR BULK FINISHING OF SMALL PARTS



FOR DRYING

FOR CLEANING

● The MULTIPURPOSE BARREL is designed to handle a one basket load. It loads and unloads easily and quickly —no hoist required and no doors to fuss with. Cup-shaped parts can be revolved at drain position for minimum dragout.

All gears and bearings are above solution level. A choice of cathode fixtures assures constant, positive contact with any size or type of load.

This equipment is available in various combinations of cylinder and tank construction for tumble cleaning, electrocleaning or cyanide plating, acid plating, acid tumbling, rinsing or drying. It's just what you have been looking for. State your requirements when writing for prices.

THE Udylite CORPORATION
1651 EAST GRAND BOULEVARD
DETROIT 11, MICHIGAN
REPRESENTATIVES IN ALL PRINCIPAL CITIES

casting and the distribution of its mass. Generally speaking, however, areas of about 1 sq in. can be held flat to within 0.001-in. while with a surface area of around 6 in. warpage would be between 0.002 and 0.015-in. depending upon the casting design.

Wall thickness can also be kept quite thin. In cases where the wall area does not exceed 2 sq in., a thickness of 0.040-in. can be cast. Where larger areas are concerned, the commercially possible wall thickness runs roughly 0.0625-in. in castings of wall areas of 4 to 6 sq in. while with wall areas up to 40 sq in., a thickness of 0.093-in. is possible.

Internal splines, ratchet teeth and stops can be cast and used without machining. Rivets can be cast integrally and gears can be cast in most alloys so that they can be used as cast, except for machining the bore.

Inserts can be cast in place. In one illustration can be seen an aluminum casting with a cast-in insert of threaded mild steel. Depressed as well as raised lettering can also be produced.

Gating is predetermined by the engineering department using a mathematical analysis of factors involved. Advantage is taken of the fundamental characteristics of the plaster mold which has very slight moisture and slow cooling rate. Basic to the flowing of metal into shape is the gating theory of slowly expanding a globule of metal to completely fill the mold cavity. As the slight oxide film is expanded against the walls of the cavity it is chilled and immobilized to become a protective film through which clean metal flows.

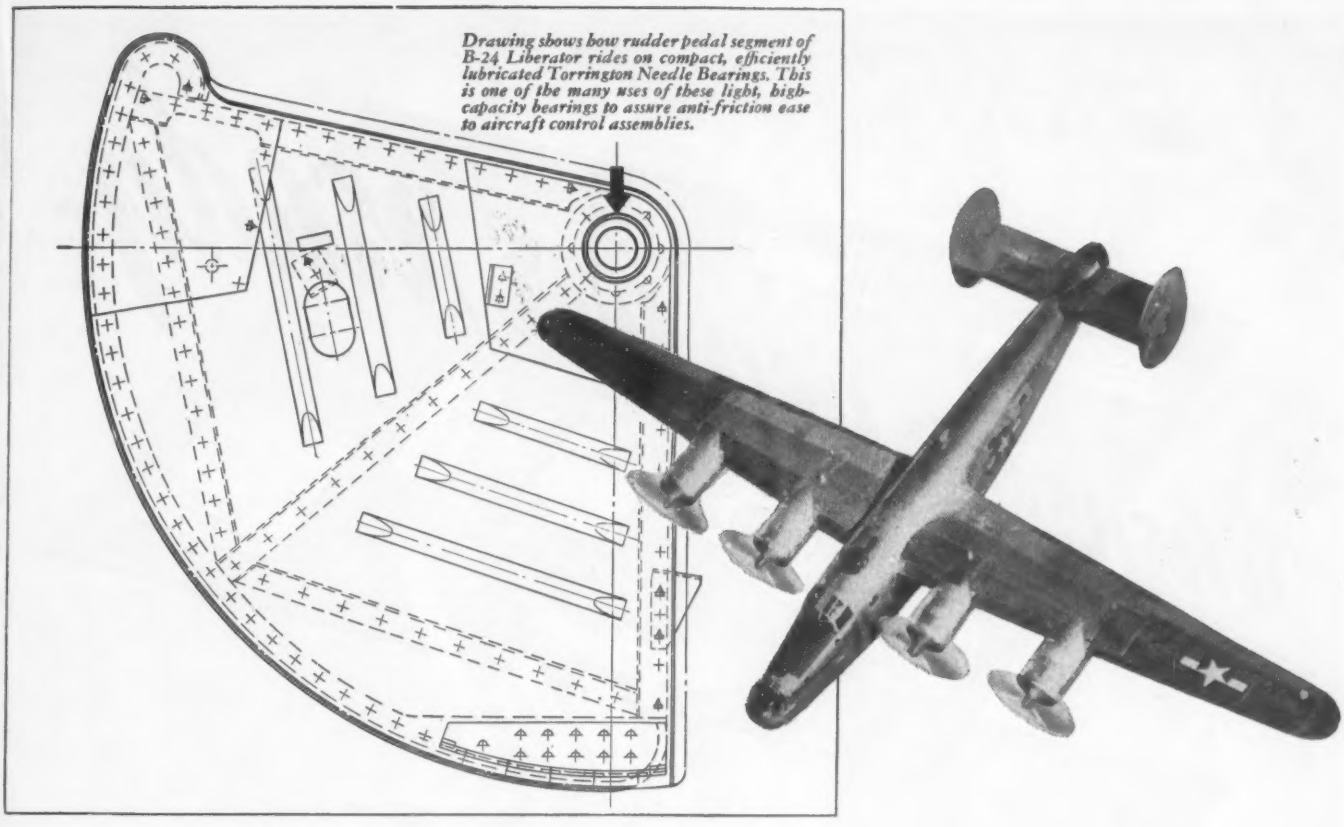
Alloys Standardized: A standardization of alloys regularly being cast has been made to further obtain economy of plant operation. Four alloys satisfy most any application; namely, a yellow brass, two managanese bronzes, and an aluminum alloy. An aluminum bronze will be handled later.

All of these alloys are readily cast with fine, smooth surfaces. Other alloys can be cast if production quantities are large enough. An enticing thought inevitably arises: Can steel or gray iron be cast? The answer at the moment is no, but it has been tried and still is being studied.

A laboratory maintains rigorous control of alloy composition and metal handling to ensure that physical and chemical specifications are met. Test bars are regularly cast for each heat of metal poured. It is to be noted that test bars are made in standard molds under standard production process conditions and gating such as used for commercial product. In this manner test bars are truly indicative of casting quality.

Any casting may be subjected to government inspection because the same rigorous control procedures are applied to all castings produced. Process control is maintained by an hourly check of all physical factors which might affect the quality of the product.

To further ensure the maintenance of quality product the inspection depart-



Drawing shows how rudder pedal segment of B-24 Liberator rides on compact, efficiently lubricated Torrington Needle Bearings. This is one of the many uses of these light, high-capacity bearings to assure anti-friction ease to aircraft control assemblies.

Rudder Pedal Segment of B-24 Liberator Rides on Torrington Needle Bearings

It is no surprise that the rudder pedal segment of the mighty B-24 Liberator, rides on light weight, compact Torrington Needle Bearings. For their full complement of small diameter needle rollers packs high capacity into small space, provides an extra margin of safety with the efficiency and reliability that is characteristic of these modern, self-contained anti-friction bearings.

Can you visualize these Torrington Needle Bearing advantages in terms of *your* product . . . aircraft or automotive equipment . . . machine or portable tools . . . household or other equipment that you want to operate with maximum ease, combined with minimum size, weight—and cost? Our Catalog 32, showing the wide range of types, sizes and applications, will help you. Write for it today.

•

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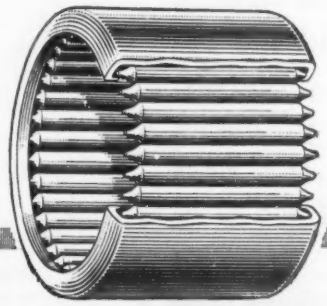
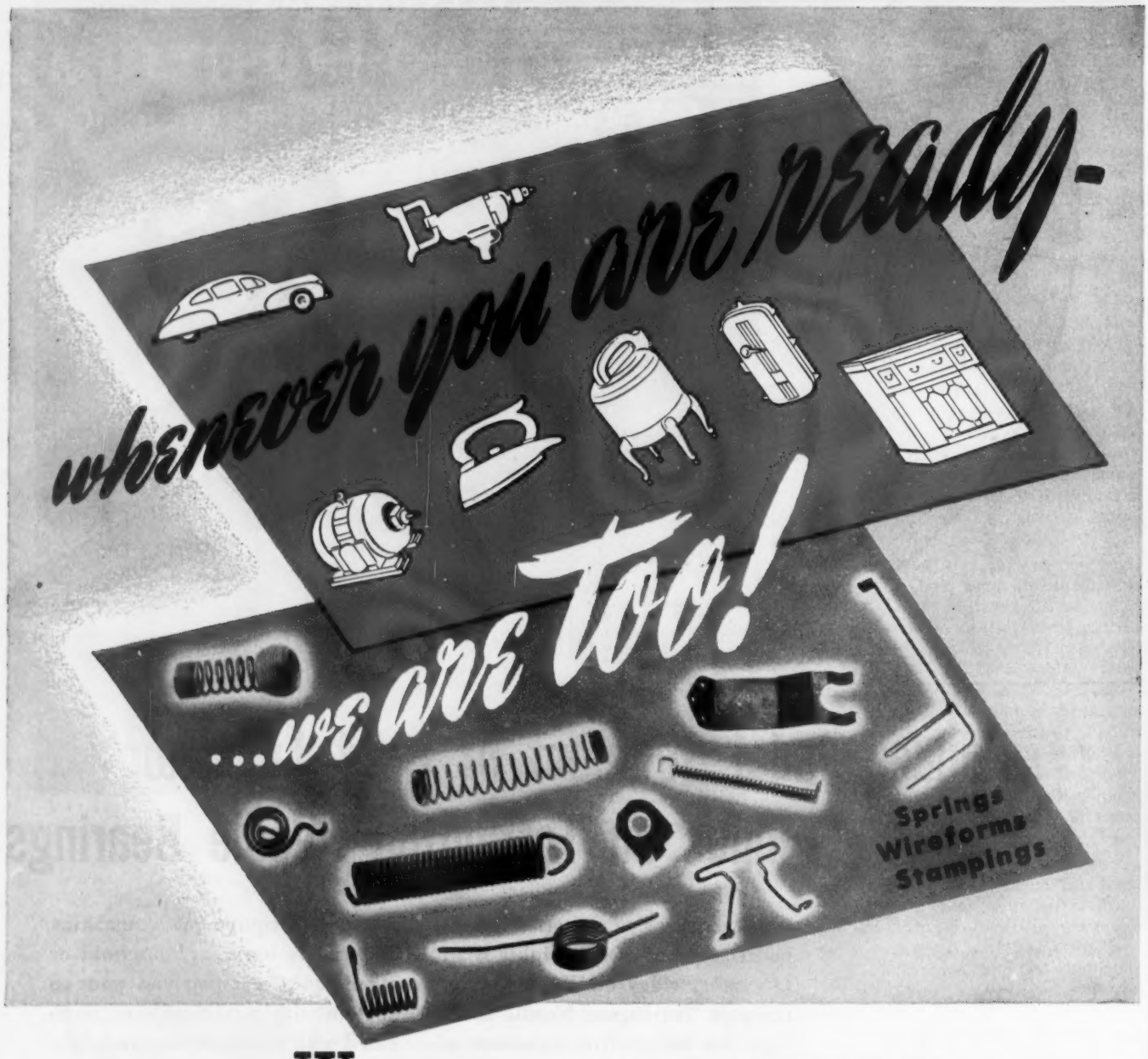


TORRINGTON NEEDLE BEARINGS



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ment applies rigid inspection to all products. Original samples are submitted for customer approval and at periodic intervals thereafter the inspection department repeats the dimensional check. Gages are regularly used for particularly critical dimensions.

Tapping Machine Fixture Speeds Shell Production

Use of a standard lead screw type tapping machine with hand operated fixture, manufactured by Detroit Tap & Tool Co., Detroit, is said to increase production rates when tapping an 0.800-in. 16 NS thread for a class 3 fit to a critical depth of exactly ⅝-in. from nose of an 81 mm smoke shell, and concentric with shell bourrelet. It also is said to practically have eliminated rejects, permitting

machine operation by less skilled workers than was needed formerly.

Operator sets an 81 mm smoke shell into fixture over a plunger and against a V-block back of shell, as shown in the accompanying illustration. With his other hand, operator swings lever about 60°. Lever is connected by a rack and pinion to plunger support as well as to transverse clamping bar. Thus, swinging lever forward causes plunger to elevate the shell until the nose contacts lower surface of locating platen, while at the same time it moves the transverse clamping bar to the left, locating shell horizontally against the V-block and clamping it into place. In this way the smoke shell is located and clamped concentrically with tap spindle and to exact height of the nose in relation to the tap spindle with a single, short movement of the lever.

Positioning smoke shell in this manner assures uniform concentricity and depth of thread on each shell. Returning lever through the 60° arc frees the tapped shell for unloading, reducing time required for loading and unloading. Drive to tap in light duty tapping machines is at base of lead screw, eliminating wind-up and making possible a fast return without injuring the cut thread. Thus, metal does not pile up on back of tap teeth.

A Tungtip Cutter for Every Job

Turn to the pioneers in Tungsten Carbide milling cutters to find a Tungtip tool for every cutting job. Face mills, slab mills, end mills, side mills, staggered-tooth slotted cutters, inserted-tooth mills, saws.

Our experience in high production cutting will help you. Give us your problem . . . get our recommendations.

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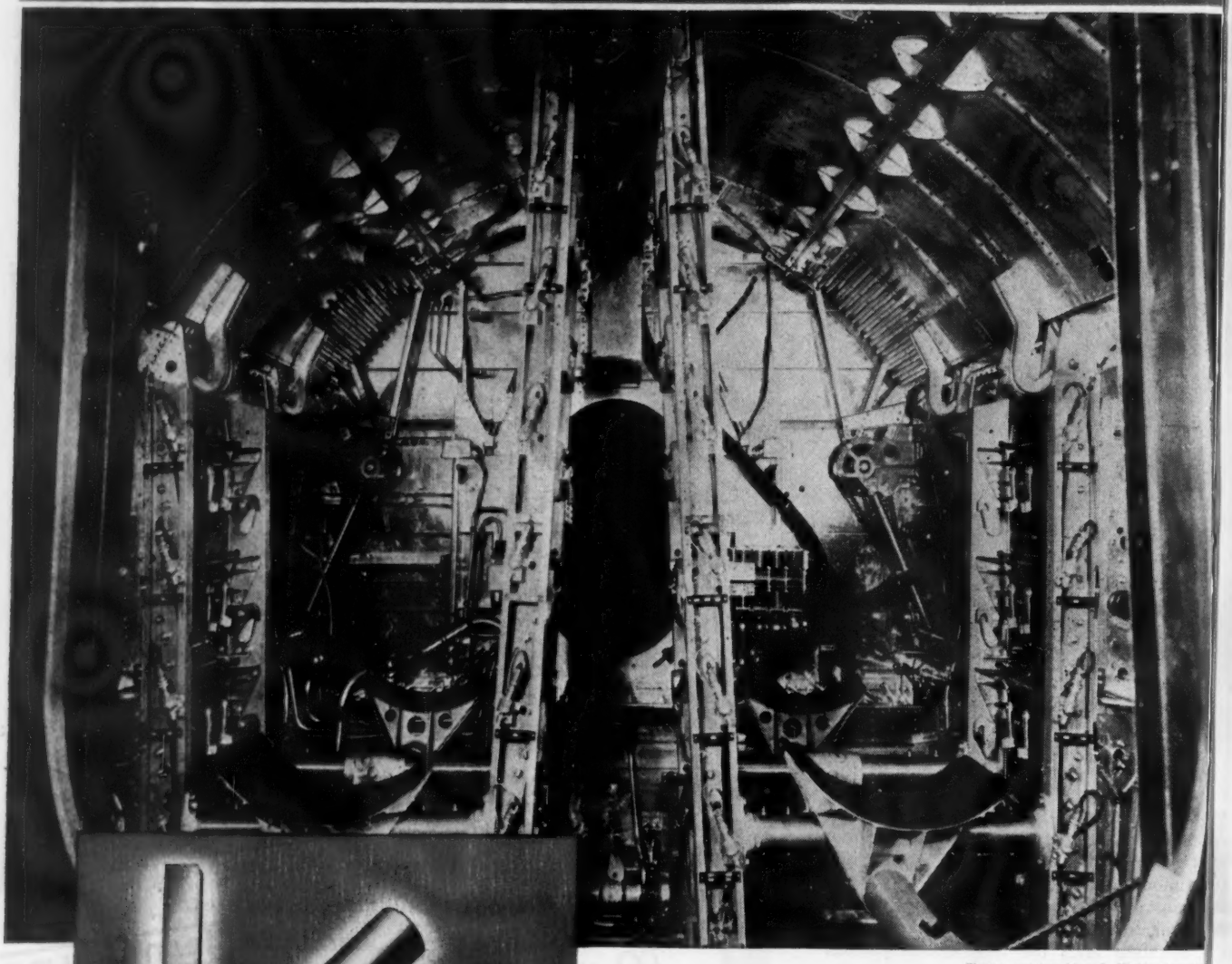
DICK GRAYSON
TO... Ed Lowell

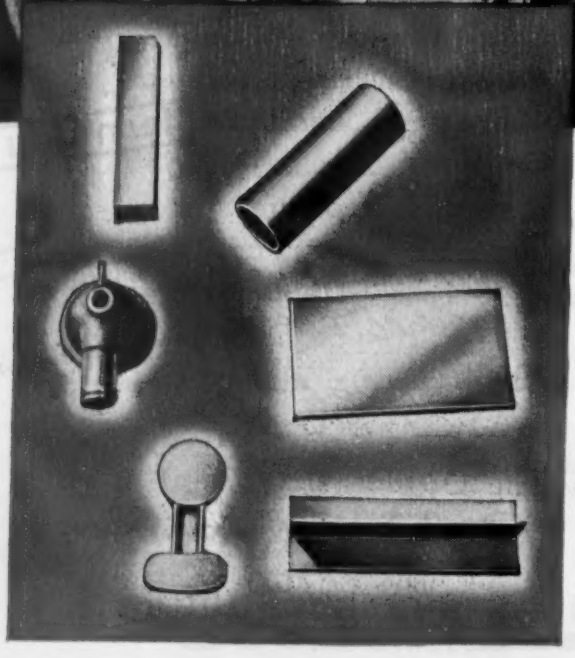
TungTips

Say Ed —
When will our new catalog + engineering bulletin be available?
Dick

Attention Dick —
By July 1st, if we can believe our printer.
Ed

How UP-TO-DATE are you on ALUMINUM?





Photos, courtesy Glenn L. Martin Company

HERE IS THE BOMB BAY of a B-26 Martin Marauder. Into the construction of this section alone go hundreds of parts manufactured from six basic forms of Reynolds aluminum alloys.

As goes the aircraft industry, so goes *all* industry tomorrow! Aircraft manufacturers today not only receive prefabricated aircraft parts from Reynolds, but in addition use this company's aluminum and aluminum alloy stock in their parts production.

THE GLENN L. MARTIN COMPANY called upon Reynolds to supply six basic shapes for production of parts shown here. Included were bar, tubing, castings, sheet, forgings and extrusions.

Reynolds offers great new alloys...startling new advantages in strength-weight factor

ALMOST OVERNIGHT aluminum has come of age. Today, it's tough, strong, enduring! Actually, new aluminum alloys developed by Reynolds metallurgists, possess unit strengths greater than most structural steels . . . yet section for section, weigh only ⅓ as much. In addition, they are highly resistant to corrosion . . . possess many other qualities of vital interest to manufacturers.

Now the use of aluminum is practicable for entire constructions!

R301 — **Reynolds armor plate alloy—tomorrow's great sheet and plate alloy! Combines a typical tensile strength of 60,000 p.s.i., superior workability, good corrosion-resistance, excellent spot-welding properties. Write for Special Bulletin 50-A. Gives characteristics, properties, other valuable data.**

R303 — **Exceedingly high typical tensile strength. Higher in fact than any aluminum alloy used in the past. Splendid corrosion-resistance. Developed primarily for extrusion and forging stock. Available also in bar, rod, extruded shapes and sheet (bare and clad). Special Bulletin 54-A gives complete information.**

R317 — **Combines free-machining qualities with high strength and excellent heat treatment characteristics. Age-hardens at room temperature after solution heat treatment, thereby eliminates the necessity of costly elevated temperature aging. Good corrosion-resistance. Write for Bulletin 55-A.**

CONSIDER ALUMINUM. Consider the special opportunities—inherent in the new Reynolds aluminum alloys. Consider ease of fabrication . . . thermal and electrical conductivity . . . reflectivity . . . non-magnetic, non-sparking and non-toxic qualities . . . pleasing appearance . . . new low costs. And finally, consider Reynolds nationwide production and service. See catalog in Sweet's . . . or write for Catalog No. 100. Reynolds Metals Company, Aluminum Division, 2520 S. Third Street, Louisville, Ky. *Consider aluminum* . . . **CONSULT REYNOLDS!**

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KONDOR DRAW

FOR FASTER, EASIER METAL DRAWING

Examine the illustration shown below. This crankcase, for a combat vehicle motor, was handled in one operation. Kondor Draw was the lubricant. Formerly three operations were required for completion of this part.

Unretouched illustration of a crankcase for combat vehicles today — pleasure cars tomorrow — drawn with single reduction using Kondor Draw.

KONDOR DRAW can do an equally effective job in your press room. It will help you accomplish easier, faster metal drawing with fewer reductions. Its use permits pressure reductions, lower power input, longer die life on either ferrous or non-ferrous metals.

KONDOR DRAW is clean, white, pleasant to use. It is non-injurious to workmen. Try Kondor Draw for better drawing results today.

KONDOR DRAW benefits are so startling and sensational that only by actual use can these facts be appreciated.

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Book Notes

History of Steel Expansion for War

Steel Expansion for War, by W. A. Hauck, Steel Division, War Production Board; published by the Penton Publishing Co., 1213 West Third street, Cleveland 13, O.; 192 pages, 8¼ x 11 inches; printed on heavy, coated paper; 148 pictures plus charts and tables; price $2 postpaid.

Mr. Hauck joined the National Defense Advisory Commission (predecessor to WPB) in June, 1940 as deputy director of the Iron and Steel Branch and since that time has been closely associated with the expansion and rehabilitation of the steel industry and associated industries.

He has inspected both large and small plants all over the United States and in response to requests from President Roosevelt, prepared several reports on the steel industry which led to the addition of 10,000,000 tons of integrated steelmaking capacity, plus over 5,000,000 tons through expansion of existing facilities.

Steel Expansion for War is an official, historical report prepared for the War Production Board in which Mr. Hauck reveals many heretofore unpublished and detailed facts about the steel industry and the ore, ore transportation, coal and coke, refractory, ferroalloy, scrap, foundry and forging industries associated with it. Data are presented on facilities installed or revamped by some 3000 companies, together with details on type of products, cost and added capacity.

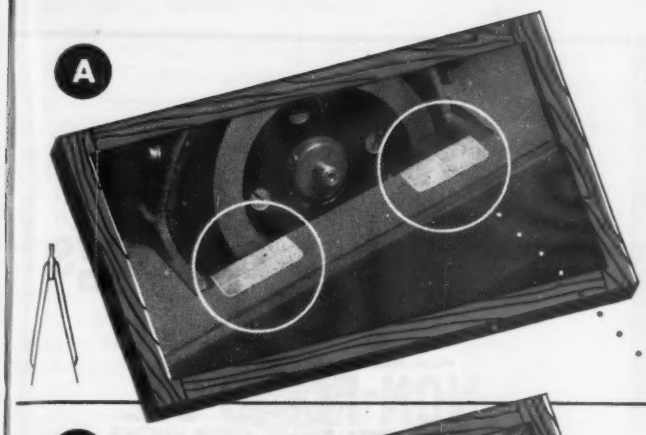
Mr. Hauck notes that the steel industry has shifted geographically from the East and Midwest toward the West and Southwest. In addition, there has been a shift in capacity from the larger to the smaller companies. U. S. Steel and Bethlehem remain in No. 1 and 2 positions, respectively, but Republic is more strongly entrenched in third place.

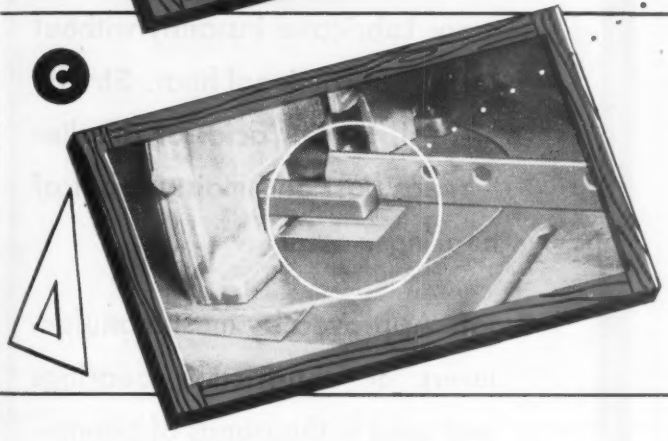
Much of the data will be used shortly in the hearings before Senator Joseph C. O'Mahoney's War Contracts Committee. The Senator believes that the method of disposing of the huge Geneva, Utah steel plant built with taxpayers' money at an expense of $196,000,000 may well set the pattern for sale of other war plants built by the government. Mr. Hauck points out that the Geneva plant was designed so that it may be converted to peacetime products.

One of the outstanding plants built with government money is operated by the Republic Steel Corp. at Chicago. It has a blast furnace, open hearths and electric furnaces for making alloy steels by duplexing method. Details on Republic's sponge iron plant at Warren, O. also are revealed by Mr. Hauck.

Henry Kaiser, who has indicated he would like to buy the Geneva steel plant, presented a plan in 1941 for the construction of a steelworks in the Bonneville, Ore, area, in addition to the plant now being operated at Fontana, Calif.

Design to *Minimize* Maintenance





Insert KENNAMETAL At *Critical* Wear Areas

LIKE the jewels in a fine watch, small pieces of Kennametal, incorporated at critical points of excessive wear, assure enduring precision performance. For example:

(A) Kennametal inserts in the grinder table provide a true, flat surface that shows no appreciable deterioration after many months' service.

(B) Inserts of Kennametal stand up for weeks under severe abrasive action of wire cleaning brushes which cut deep into steel leveling guides in less than one day.

(C) Steel sliding surfaces of abrasive saw rest wore quickly, until reinforced with flat blanks of Kennametal, which make smooth, durable surface that outwears steel up to 100 times.

Why KENNAMETAL Withstands Wear . . .

- 78 Rockwell C hardness, as compared to 66 for hardened tool steel.
- Low coefficient of friction with other metals; non-galling.
- Dimensionally stable; creep is negligible.
- Modulus of elasticity is 2 to 3 times that of steel; effective resistance to deformation.
- Highly resistant to corrosion, erosion, and oxidation by electric arcs.

These typical applications of Kennametal, in simple forms, suggest how its unique wear-resistant properties can be utilized to make your product give better service at less cost. Keep in mind that Kennametal can be molded into almost any shape, limited only by reasonable proportions, but . . .

For the present—because our efforts are devoted primarily to the manufacture of tools for use in war plants—we can serve you most effectively if you plan to use readily available shapes of Kennametal, such as flat blanks, balls, and discs. However, if your wear problem is not easily solved with standard shapes, don't hesitate to ask us to suggest how it may be solved through freer, more imaginative application of Kennametal—the metal that masters wear.

KENNAMETAL

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TRADE MARK REG. U. S. PAT. OFF.

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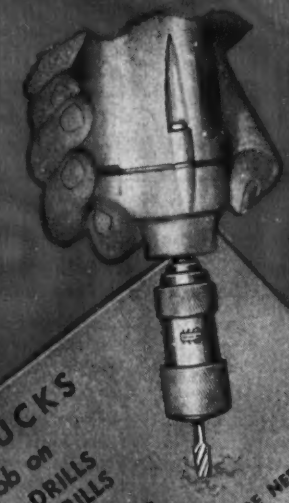
Let us send you this New Booklet just off the Press. Fill out and mail coupon below.



Knock-Out CHUCKS are doing an ideal job on
SMALL ELECTRIC DRILLS
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AND WHEREVER GOOD CHUCKS ARE NEEDED

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MODERN STEEL MILL LUBRICANT

Insures greatest efficiency and long life. Eliminates pitting and corrosion. Reduces maintenance cost.

Reason: Lubricates instantly without the aid of frictional heat. Strictly neutral, free of acids or alkalies —keeps dust and moisture out of bearings.

Proof: Approved by most manufacturers of anti-friction bearings and used in thousands of plants—after tests of samples.

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Better Lubrication at Less Cost per Mon

Synthetic Resin Enamels

(*Continued from Page* 100)

cal parts of vehicles made in these plants. Fig. 3 shows axles being spraypainted. After finishing, the axles are dried by the infra-red lamp oven at upper left.

The paint manufacturing department at Highland Park is one of the finest in the automotive industry. In pre-war days when 5000 cars a day were assembled, approximately 40,000 gal or six carloads of paint were produced daily.

In a section of the one-story building housing the paint making equipment, 52 steel paint mills, ranging from 2000 to 15,000 lb capacity, disperse pigments in the resins. The largest mill is 8 ft long and 6 ft in diameter. Materials are ground fine by ¾-in. ball bearings.

Mix room has 50 tanks varying from 10 to 4000-gal capacity for stirring the enamels. In the largest tank a carload of paint can be mixed in an 8-hr shift.

Synthetic resins are cooked for the enamels in a special department in four electrically operated heated kettles. Rigid temperature controls are maintained.

On the first floor of the building the paint department maintains a batch room where small quantities of paints are mixed for truck fleet owners requiring special colors. Near it is the well-equipped laboratory where every paint shop operation is reproduced in miniature. Here paints are tested thoroughly and methods are developed and perfected before becoming regular shop procedure.

Testing Procedures

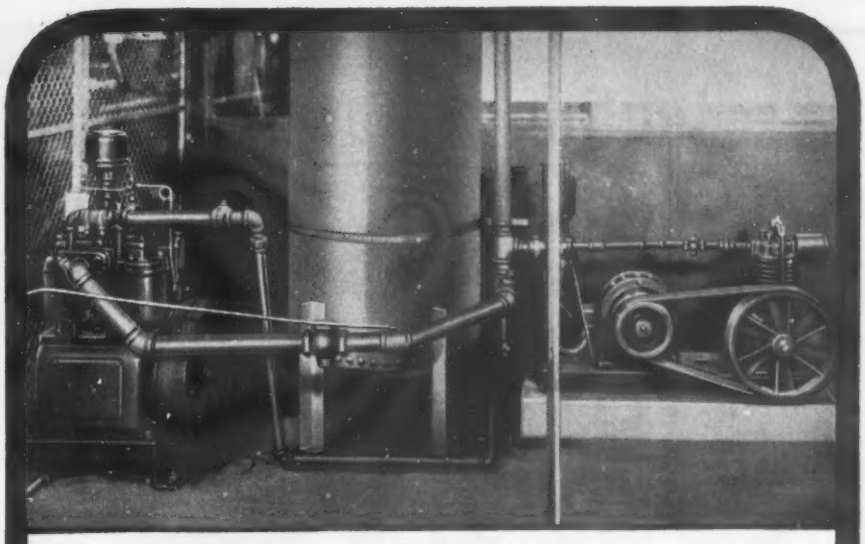
Paint testing chiefly is done according to government specifications. One procedure calls for primer coats to be tested after being applied to small 20-gage sheets of cold rolled steel and baked under infra-red ray lamps for 12 min at 350°F. As some Ford branches use steam ovens for paint drying, other test panels are given an hour at 250°F. Samples then are sanded, wiped and washed in naptha, wiped again and given two double coats of body enamel. Next the paint samples are baked by steam.

When the last heat process is finished, test panels are checked for luster, color, adhesion, working properties, "orange peel", fill and other conditions. Other painted test panels are shipped to Jacksonville, Fla., for testing under extreme exposure conditions, standing in the sun and salt air from 1 to 24 months. At regular intervals, the samples are returned to the laboratory for checking color and luster retention, blistering, peeling, cracking and flaking.

Paints also are given a bend test. Panels are painted in the regular way and bent through a 180° angle on a special machine. Thus flexibility of the paint is checked carefully.

The bend test machine is a cone-shaped mandrel varying from ⅛-in. to 1½ in. in diameter. The cone, 8 in. long, is held horizontally by a strong frame. Paint test panels are given a 180° bend about the cone in 13 sec, using a hand-operated roller.

Use of synthetic enamel by Ford dates



At Parker Pen Factory

CURTIS COMPRESSORS

Deliver 60 cfm of Air at Low Cost of only 12c per hour

USING two Curtis Air Compressors, the Parker Pen Company factory at Janesville, Wisconsin, uses air for a variety of jobs in their factory.

Air is being used to replace noisy blowers on gas furnaces, to operate air valves on various special machines — such as operating a high speed internal grinder and operating ejectors to clear work from 20 punch presses, blowing dust out of dies, and for cleaning up around automatic screw machines.

Compressed air also controls the "dry pipe" sprinkler system, eliminating the possibility of water lines freezing.

D. A. McLaughlin, Supt., states that "the power cost on our larger Curtis Compressor does not average over 36c a day for three hours' operation, *making our cost for air remarkably low*. The operation of these Compressors, with no repairs and only ordinary oiling and cleaning — has been so satisfactory that we are highly pleased with Curtis Compressed Air Service."

Here is just another example of the dependable, efficient service you can expect from Curtis Air Compressors . . . the result of such experienced design features as:

TAPERED ROLLER BEARINGS — CARBON-FREE DISC VALVES
CENTRO-RING LUBRICATION — AUTOMATIC PRESSURE UNLOADER
PRECISION CONSTRUCTION THROUGHOUT

Write for our free booklet
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YOUR SCREWDRIVING ASSEMBLIES BY USING THESE MACHINES

Model B Will Drive Screws From No. 6 to No. ¼, in Lengths 3/16 to 1½ Inches

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All Screws Driven to a Uniform Tension

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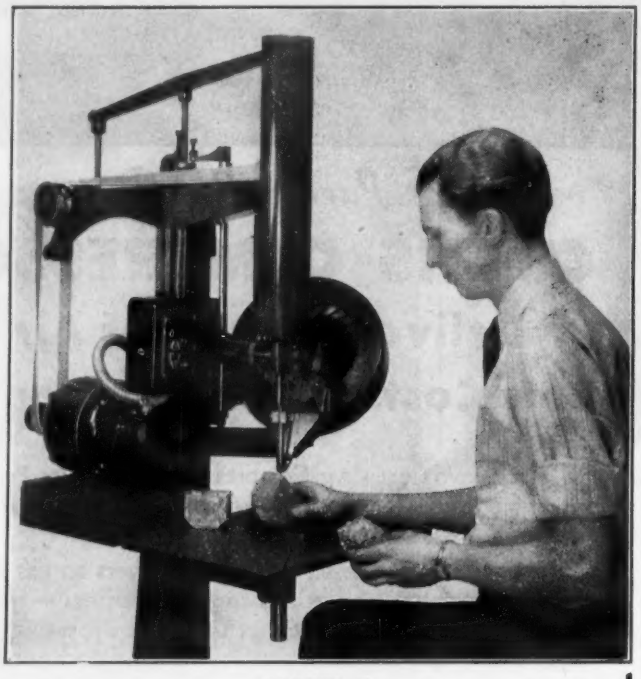
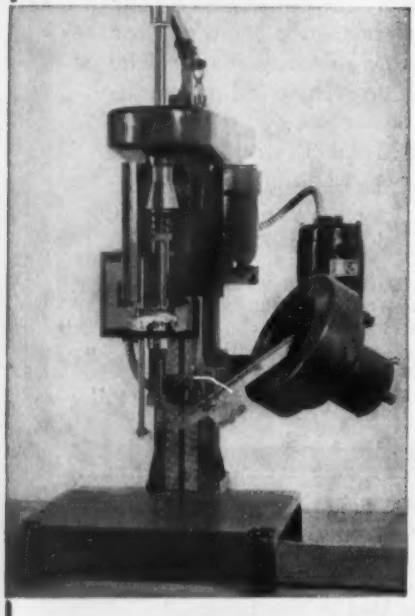
No Marring of Heads



MODEL B

MODEL A



Model A Is Designed to Handle Small Screws in Sizes From No. 2 to No. 6 In Lengths From 3/16″ to ¾″.

•

Driving Time One Second Per Screw

•

Send Sample Assemblies for Production Estimates and Quotations

ASK FOR CATALOGUE

Detroit Power Screwdriver Co.

2813 W. Fort St., Detroit 16, Mich.

back to 1928 when it was first applied to wooden truck parts and wire wheels. In 1932, Ford experimented in finishing cars, and a year later the paint was used on the standard Ford cars. Later the deluxe models were covered with it, and by 1937 it was used on Lincoln-Zephyrs.

Newest Floating Bridge Has Many Innovations

Army Engineers have tried out and are using overseas a new all-aluminum, 50-ton floating bridge. Light in weight, almost 2 ft wider than its predecessors of ponton type, and capable of being assembled in minimum time, the new structure comprises three main parts: (1) Hollow deck balk, (2) removable gunwales, and (3) half pontons.

Assembly, as described in the May *Aluminum News Letter*, is quite simple. Two half pontons, each 30 ft in length and weighing only 1700 lb, are locked stern to stern with connector pins to form a complete ponton which alone will support safetly 26 tons. Bow of each half ponton has been designed to an "ideal curve" to enable it to ride swift currents. Removable gunwales attached to each ponton provide foundation for the deck balk which is fixed in place by lugs and pins.

The deck balk, which replaces both balk stringers and chess flooring in the older type wooden decked bridges, is in itself an innovation. Fifteen feet in length, 9 × 9 in. in cross section, and 215 lb in weight, a single deck balk many be carried easily by four men, yet afloat, it will support a 300 lb load.

Placed parallel to flow to traffic, balks are staggered to distribute load, making entire deck a continuous beam. Disabled pontons may be unfastened from deck with ease, towed out, and replaced. Decking itself is so buoyant that if every ponton were sunk, deck alone still could support a loaded truck.

Carried in 69 trucks and trailers, one bridge set provides about 436 ft of floating bridge and 180 ft of fixed bridge, or total of 616 ft. A section about half this overall length was set up in 2 hr and 12 min in the first service test.

Test Leaching Rate of Copper Paint for Ships

B. H. Ketchum, J. D. Ferry and A. C. Redfield of the Woods Hole Oceanographic Institution, Woods Hole, Mass., and A. E. Burns Jr. of the Navy Yard, Mare Island, Calif., have developed a test in seawater of the rate at which copper must leach from antifouling paints to keep ship bottoms free of marine growth. It applies only to paints which depend on copper or copper compounds as the toxic agent.

DISSTON

Plastiron
Plastalloy

Specialized mold steels that meet exacting manufacturing requirements

Plastiron is of low carbon content, melted and hot-worked with great care, and is as clean and soft as the steel-making art can produce. It is exceptionally easy to hob, and is ideal for intricate shapes and short runs.

Plastalloy is a low carbon, nickel chrome steel of finest mold quality. It is annealed to provide ease of hobbing, and it develops an extremely hard, deep case, having high resistance to swamping and erosion.

Each is produced by modern steel practice from carefully selected ingredients, in electric furnaces, and under careful control. Each provides these important advantages:

- A low carbon content
- Thoroughly clean and uniformly sound
- Produces unusually smooth cavities
- Will withstand extreme hobbing
- Carburizes evenly
- Ideal for difficult shapes

Disston engineers will be glad to help you with your postwar plans

The wide experience of Disston engineers and metallurgists with the plastics industry is at your service. You may feel free to consult them at any time regarding your mold problems. They will be glad to cooperate with you, advise you frankly, and without obligation. Write fully, and in confidence.

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THIS shell fuze is an extremely complicated mechanism demanding close-tolerance work throughout. Millions of these assembled fuzes have been produced *complete* at Federal Screw Works, with only the springs and stampings obtained from outside sources.

We can now do the same sort of work for *you*—producing COMPLETE ASSEMBLIES of screw machine products and cold-forged parts to your exact specifications. Without obligation on your part, we'll be glad to quote on your requirements.

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ARMY E NAVY
CHELSEA DIVISION

Federal SCREW WORKS

DETROIT AND CHELSEA, MICHIGAN
MAIN OFFICES: 3401 Martin Ave., Detroit 10, Michigan

Japanese Machine Tools

(*Concluded from Page* 102)

The press also has a tapered spindle which takes up spindle wear that the machinists said they would like to see incorporated in American models.

The Japanese milling machine shown in Fig. 3 when salvaged was lying in a pile of broken concrete and half covered with mud and rubbish, minus its motor, V-belt drive, and all knobs. A 75 mm shell hit and small caliber ammunition had added their destructive effects to Japanese attempts at sabotage. The over-arm had been broken off about midway. The part severed from the machine had been further divided into three shattered pieces. Part of the over-arm was completely missing. The table, the column and the knee had shrapnel dents. The arbors were missing, one of the outboard bearings on the over-arm was gone, and the dividing head and tail stock were missing.

Replacing the over-arm turned out to be quite a job. It had to be welded together and the missing parts machined into shape. Almost 15 lb of welding went into the over-arm alone.

The milling machine, a Japanese version of a No. 3 Cincinnati, has an attachment for spiral cutting. It is used for building splines and all gears needed to repair battalion equipment.

Fig. 4 shows a Japanese Simamoto lathe in an early stage of reconstruction. The hole on its left side was made by a 50-caliber machine gun slug when United States forces invaded the island.

Parallel Generator System Aids in Electrifying Aircraft

Parallel generator operation, a development of General Electric Co., Schenectady, N. Y., is expected to be an important step in completely electrifying large military aircraft. Paralleling permits plane's generators to rescue one another instantaneously and automatically, resulting in continuous power supply to all electrically operated turrets, even though part of system is out of commission. It permits use of an ac system throughout the plane, thus contributing to good performance of electric equipment at high altitudes and minimizes problems of commutation and brush wear.

In a demonstration of the parallel principle at Schenectady, company engineers used two 400-cycle, 30-kw, 40-kva aircraft alternators. Each alternator was driven by a 450-hp aircraft engine through Sundstrand variable ratio drives, governed to maintain synchronism and equal load division in spite of imposed variations in engine speed. A special air cap over the exciter end of each alternator provided cooling air for the ground test, substituting for rammed air. A gear box arrangement was used to simulate the step-up gear for accessory drive employed on actual aircraft engine installations.

The Men that Know "HOW" *and* "WHY"

PUT OUT MORE PRODUCTION . . . WITH LESS WASTE!

DOUBLE VV PROGRAM

V1 ICTORY in the Pacific requires the salvage of 8,000,000 tons of waste paper this year. Paper is critical; save every scrap!

V2 ETERANS in hospitals will appreciate the extras your community can provide with money from the sale of waste paper. Save for them!

SAVE WASTE PAPER

THE special high-alloy steels take more knowing than ordinary materials, that's sure. But they also *give* you more—so much more that their uses have taken one of the steepest upward climbs of any class of materials in recent years.

Electric furnace steels are on the march. Our principal special steel products—corrosion and heat-resisting alloys, tool and die steels, electrical, valve and nitriding steels—have been among those in keenest demand for war use. They're also products which offer you the greatest future promise.

As pioneers and originators in these fields, we have the data your engineers and designers need, and the working information for your shopmen to handle special steels well and speedily. Let us help you.

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GENERAL OFFICES: BRACKENRIDGE, PENNA.

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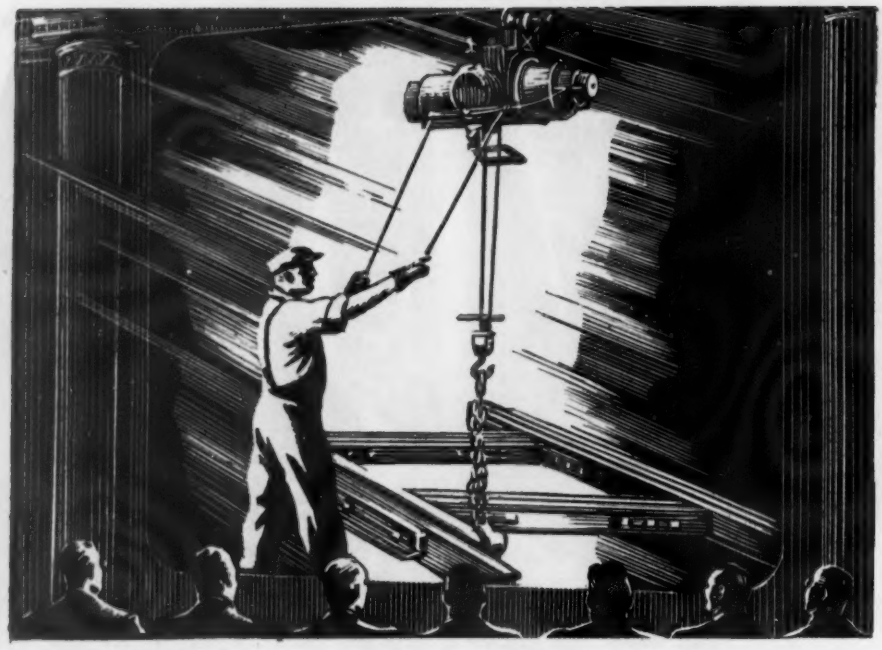

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Electric Furnace

(*Concluded from Page* 114)

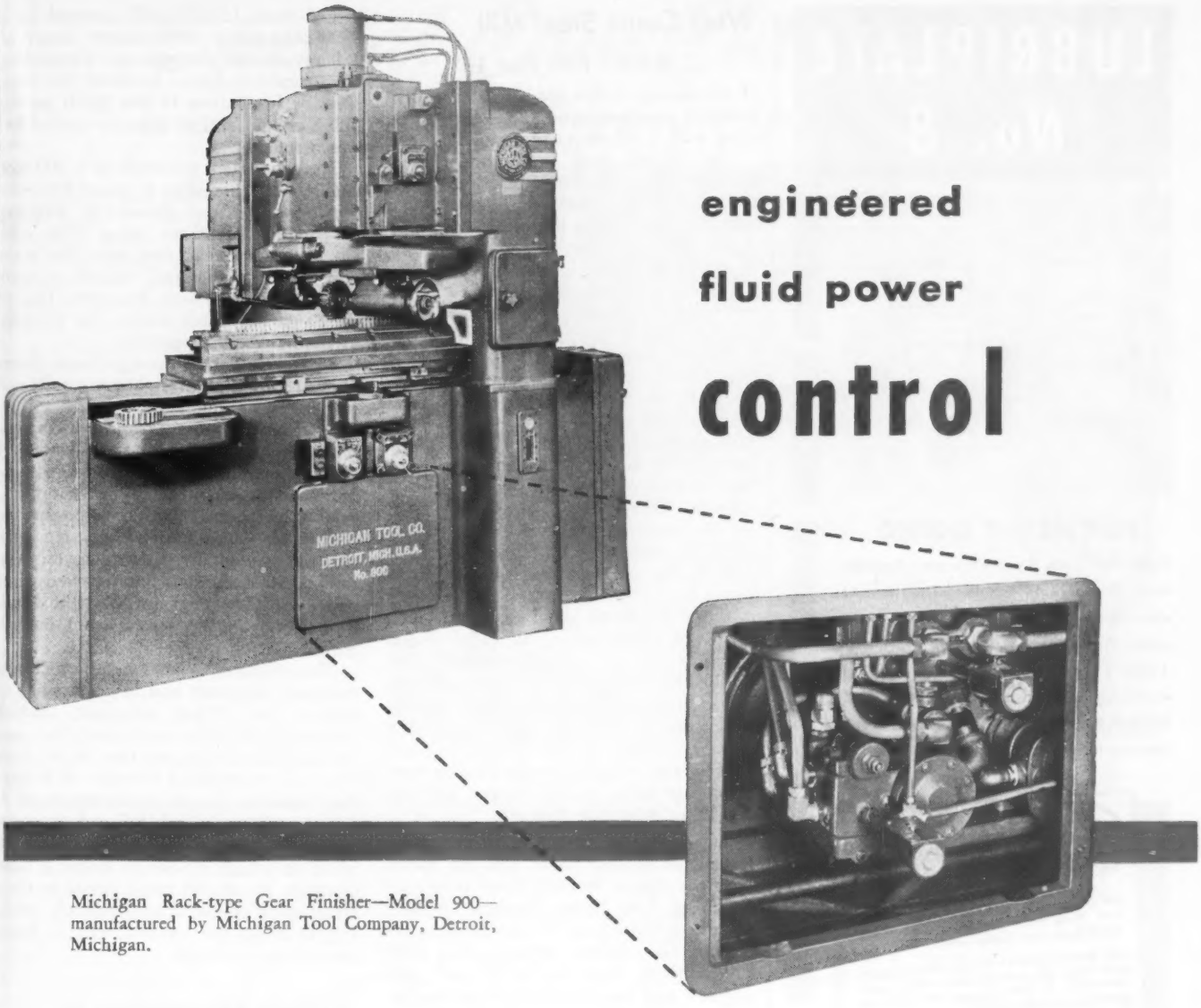
in Fig. 3. With the truck loaded and ready for heat treating, the operator pushes the "Load-to-Furnace" button. The furnace door is hoisted, and stops when it hits a limit switch. Simultaneously, conveyor motor is started and the truck is moved through the quench hood (these doors are open except when quenching) and then into the furnace until the truck hits a limit switch. The motor then stops, the door of the furnace closes, and the load is soaked at heat-treating temperature for the required length of time.

Succeeding operations are initiated by pressing the "Furnace-to-Quench" and the "Quench-to-Unload" buttons, while a button marked "Furnace-to-Unload" permits the load to be moved from the furnace directly to the unloading position. A fifth button, painted red and much larger than the others, is for emergency stop purposes. A selector switch located in the control cabinet at the back of the furnace, when turned to "Manual," permits the operation of push-buttons which independently control the conveyor, the furnace door, quench door, and the quench valves. In addition, suitable limit switches, solenoid valves, water level switches, etc. are included for complete automatic operation.

Main power for the heating units is brought from the power bus through three-pole, fusible switches mounted on a power panel and from there through the three controlling or "throttling" reactors to the furnace. The effect of the reactors in the circuit is varied by special power panels. These, in turn, are governed by temperature controllers, which independently derive their information from chromel-alumel thermocouples, located in the top of furnace near fans.

A continuous power flow type of control is used, because the fast heating cycle requires a high rate of heat transfer early in the cycle. Continuous control of input prevents "overshoot" as the temperature reaches the control point, while continuous throttling prevents "overshoot" during the soaking period. This control is much easier on the power system than the "on-off" type, since there is never an actual interruption of the circuit.

The saturable-core reactor, consisting of a laminated iron core with three windings, acts as a valve to regulate the amount of electric power flowing to the furnace. The two alternating current windings are connected in series with the furnace and the main power supply, while the direct current winding is connected to the special power panel. With no current in the direct current windings, the impedance of the alternating current winding is high and most of the power-supply voltage appears across the reactor. Hence the power input to the furnace is at a minimum. The reverse is true when maximum current flows in the direct current winding. Intermediate values of power input are obtained by varying the current in the direct current winding.



Michigan Rack-type Gear Finisher—Model 900—manufactured by Michigan Tool Company, Detroit, Michigan.

engineered fluid power control

The hydraulic controls which make this machine—and millions of others perform with such reliability—call for tubing systems based on the principles of Fluid Power Engineering.

When properly engineered and built, these systems have certain "must" features—

1. They streamline the flow of fluids. This permits adequate response to control with minimum system capacity.
2. They make minimum demands on the power source—an economy feature.
3. They fit into the available space, even when space is limited and cramped.
4. They are planned for easy accessibility to all parts—for service and maintenance.
5. They have the smallest number of joints and connections—all leakproof—even under high pressure, vibration or abuse.

FLUID POWER engineered systems—with Parker valves, fittings and fabricated tubing meet these requirements. They are backed by more than twenty years of "know-how".

If you plan to use Fluid Power—if you need tubing installations for any purpose—ask a Parker engineer for recommendations. The Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, Ohio. Booklet on request.

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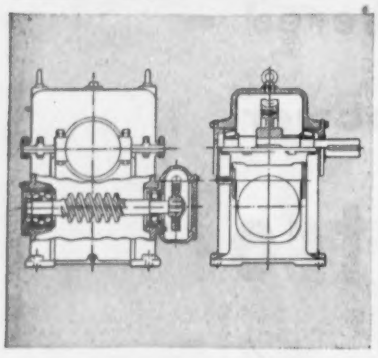
FLUID POWER ENGINEERING

LUBRIPLATE
No. 8



FOR HEAVY GOING

LUBRIPLATE No. 8 possesses an extremely high film strength and is just the correct density for the general run of enclosed gears (speed reducers). It is especially suitable for worm gears and other types carrying heavy loads. Typical of all LUBRIPLATE lubricants, No. 8 has exceptionally long life.

Rx FOR YOUR MACHINERY

No. 3—Ideal for general oil type lubrication. Ring oiled bearings, wick feeds, sight feeds and bottle oilers.

No. 8—Because of its high film strength and long life reflects outstanding performance in most types of enclosed gears (speed reducers).

No. 107—One of the most popular grease type products for general application by pressure gun or cups.

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No. 130-AA—Known nationwide as the superior lubricant for open gears, heavy duty bearings, wire rope, etc.

BALL BEARING—This is the LUBRIPLATE lubricant that has achieved wide acclaim for use in the general run of ball and roller bearings operating at speeds to 5000 RPM and temperatures up to 300 degrees F.

Write for a booklet, "The LUBRIPLATE Film", written especially for your industry.

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FISKE BROTHERS REFINING CO.
NEWARK 5, N. J.
TOLEDO 2, OHIO

West Coast Steel Mill

(*Concluded from Page* 110)

of scheduling at the open hearths which prevents overlength pouring, thus operating with a minimum of scrap.

The 24-inch mill billets are moved from the cooling pit to flat cars by 15-ton overhead crane, and are brought over standard trackage to the rod mill storage yard. The sheet bar stock from this mill is sawed to order in multiples so that the sheet mill can shear in the lengths desired to accommodate customer orders without loss by croppage.

Blooms from the 26-inch mill shear that travel in straight line move about 40 feet onto a tilting table and to the 18-inch mill. This is a 2-stand 3-high mill, powered by a variable-speed 1500-horsepower motor with 3-roll speed selection from 65 to 107 revolutions per minute. This makes billets in two passes on the roughing and two passes on the finishing stand to finish sizes 2¼, 2½, 2-3/4, 3, 3¼ and sometimes 4 and 5-inch squares.

From the finish stand of the 18-inch mill, the billets return to billet shears and are cut in multiples suitable for finished bar length. They are then kicked into a cross-over and travel down a conveyor line to billet storage where they are again kicked off into cradles, preparatory to cold charging for the 12-inch merchant bar mills, or are charged hot into the billet reheating furnace.

Tie plate bar, from the 18-inch mill, after the blooms move straight ahead onto the tables, receives three passes on roughing, four passes through finishing stands dimensioned 8½ to 11¾ inches wide. The various sections come from the finishing stand to the 24-inch mill hot saw and are cut into 30-foot lengths, are pushed to the cooling bed and then to conveyors which run them back into the tie plate punching bay, where they are sheared to length and punched for spike holes. Here they are inspected and stored for shipment. All western railroads are Columbia customers.

The merchant bar mill is a 12-inch mill, producing various size angles, channels, plain rounds and squares, hot rolled strip, guy clamp sections, hexagons and flats and reinforcing bar.

The billet reheating furnace accommodating the 3-high 18-inch mill takes any billet size from 2¼ to 4 inches square and in 6 to 11-foot lengths. It is a continuous gas-fired furnace with four front, three bottom and four side burners to facilitate reheating. The billets travel on water-cooled skid pipe until the last 9 feet of the hearth. Billets are manually barred off this hearth at about 2200 degrees Fahr. into a trough and pushed mechanically into the first pass on the 18-inch mill roughing stand. Depending upon the production being rolled, billets receive from three to five passes in the rougher. This is powered by a 750-horsepower motor turning 505 revolutions per minute to give a roll speed of 112 revolutions per minute.

After this roughing the billets proceed to a 5-stand 12-inch mill powered by a 1500-horsepower direct-driven motor of 230 revolutions per minute. Depending upon production sizes involved, the work receives from three to five finish passes, being either hand or repeater looped between stands.

The work then proceeds to a 200-foot cooling bed, thereafter to shears for order dimensioning, and thence to shipping car or storage—there being little storage now. Railroad cars enter the main part of the rolling mill and these spurs connect directly with the main line of the Santa Fe, which borders the 400-acre Pittsburg works properties.

Some production through these shears is passed through straightening rolls and is bundled for shipment.

A feature of this Pittsburg works rolling mill operation is its neat control of production schedules. It has been embarrassed often by manpower shortages, yet has maintained continuous production remarkably close to schedule. In spite of a large manpower shortage, this Columbia Steel division has received three renewal "E" awards and flies the Maritime flag with three stars from its halyards.

The rolling mills have metallurgical department observers and inspectors are on duty at the 12-inch merchant, 26-inch blooming, 24 billet and sheet bar, and 18-inch billet mills, one man to the turn. The mill maintains a foreman of inspection, assuring precise conformance to A. S.T.M., Navy, federal, railroad or customer specifications. Of course, this operation on schedule with so severe a labor shortage has meant much resort to overtime; some employes are willingly working 16 hours per six day and 12 hours per seven day week.

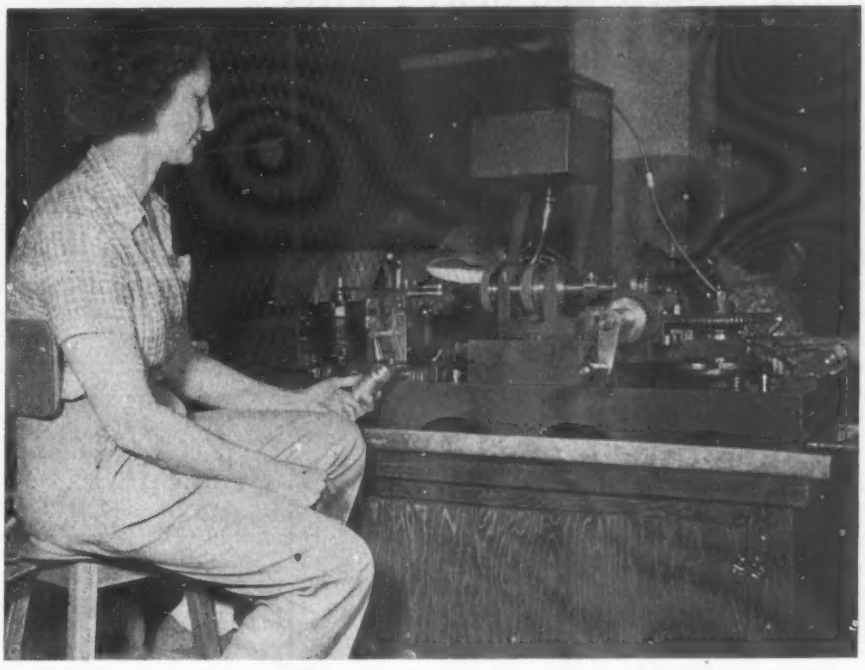
Surface Preparation Is Corrosion Resistant

An adhesive, corrosion resistant surface preparation for use in preparing aluminum and its alloys for painting and lacquering, developed by Technical Processes Division, Colonial Alloys Co., Philadelphia 29, can be applied either by a hot immersion process or by a cold spray, brush or immersion method. Hot immersion method consists of dipping work for 3 to 30 min in hot chemical solution, rinsing and drying, after which it is ready for painting or lacquering. Cold spray, brush or immersion method includes applying a chemical solution at room temperature by spray, brush or immersion, allowing 15 sec to 1 min for setting, then rinsing surfaces free of applied solution. Work is dried and ready for painting or lacquering.

Both methods are recommended for paint and lacquer adhesion and may in many cases replace sand-blasting or anodizing of aluminum surfaces. Hot immersion method is said to be better than cold method for increasing corrosion resistance of aluminum, but cold method also is satisfactory. A feature of the cold method is that it can be applied to aluminum already assembled.

Special Cam Cutter ...

saves time and labor in making precision instrument parts



SPECIAL cam-cutting machine, designed to cut two irregular curved small-dimension tracks on the inside of a thumb-size metal barrel, has proven highly successful in operation, speeding production of instruments utilizing the barrel cam. One job formerly consuming 80 hours of highly skilled labor now is completed in 15 minutes with the machine.

A typical instrument requiring the barrel cam is an aircraft electric gunsight. The cam, 1 3/8 inches in diameter and 3 inches long, is essential in focusing gunsight lenses on the target. Lenses are moved by a small metal shoe which catches in the 0.062 x 0.072-inch cam tracks. Unless tracks are perfect, it is impossible to obtain clear and accurate focusing.

Fairchild Camera & Instrument Corp., New York, built the machine to meet urgent need for 5000 cams. Only standard equipment in the new unit is a high-speed electric motor. Planned assembly includes carriage, chuck, and two master cams in one unit; stationary followers in the second; and a third, the cutter head unit.

The master cams, governing track cutting and giving the machine forward motion, were most difficult to design. For one master cam revolution, the barrel turns three times, and a track is milled on its smooth surface. Revolving action is obtained by worm gears. Weights keep master cams in constant contact with stationary followers.

Special care was necessary in designing the cutter head to make it small enough to fit inside the barrel cam. It revolves 5000 times a minute and is motor driven through a round belt with an arrangement similar to that of a sewing machine.

Carriage is mounted on ball bearings and is so sensitive that slightest cutter dullness or smallest break easily is detected by the operator through its handle. It provides forward motion through the master cam by holding the cam and chuck.

All machine parts except the cast iron base are welded. Pattern making time thus was kept to a minimum. The machine, as shown in the accompanying illustration, is 1 foot high with a base about 3 feet long and 1 foot wide.

Only two days are necessary to master fundamental cam-cutting operations. The cutter in the head directly under the lamp, is pushed into place with a metal sleeve on the carriage, and power is turned on. Kerosene, from the tank above the lamp, lubricates the action and cleans stray chips from the cutter. The operator steadily turns the carriage handle as the cutter removes solid metal, moving the cam slowly while the cutter makes its first track. A second track is cut by repeating the operation. The carriage handle originally was turned by power, but it was found easier to detect difficulties with hand operation. Flat master cams beneath the hook at right govern motion. After cutting, the cam is carefully inspected.

Although this machine was designed to machine a particular type of barrel cam, it also is believed to be adaptable to other types of cutting on telescopes, binoculars and other optical devices using similar tracks.

Synthetic Cement Forms Flexible, Waterproof Bond

A synthetic organic cement, Pliobond, developed by Goodyear Research Laboratory, Akron, O., is said to be applied easily and to adhere at once to any clean, dry surface. Cement forms a flexible, waterproof bond with high tensile strength and retains these characteristics at temperatures ranging from 70° below to 140° above zero F. It can be used to bond wood, plastics, rubber, fabrics, and metals together, or any combination of them.

An important war use is in manufacturing machine gun chutes for the Navy, devices for transporting empty shells leaving guns into receptacles. Chute resembles a flexible steel tube but is rectangular in cross section. It is made by winding a long steel strip in spiral fashion and in proper rectangular form. To keep spiral from flying apart, a long strip of canvas must be bonded down each of four sides of chute. Bond is capable of withstanding high humidity, salt spray, corroding action of gun oil containing ether and of high octane aviation fuel or aromatic gasolines, in accordance with Navy requirements.

Cement also is useful in the aircraft industry for bonding insulation into place and for attaching small objects such as gaskets on hand-hole covers, sealing strips around windows, crash pads, floor coverings, etc.

A postwar use for this product is anticipated in manufacturing conveyor belts for farm machinery such as reapers, binders, threshers, etc. Cement also may be used for attaching small tags, metal plates, etc., on machines and the like. Such plates now are put on with screws or bolts. It is expected that Pliobond will simplify attachment and prevent them from working loose from vibration.

Arc Timer Records Welding Procedures

An arc timer for use in conjunction with a production welding control system has been developed by Harnischfeger Corp., Milwaukee. Timer is an electric clocking device connected to a welding machine circuit. It records actual time spent by operator in depositing weld metal. The system affords a means of controlling welding procedures, production, quality and cost.

THE BUSINESS TREND

War Order Cutbacks Spur Reconversion Plans

BUSINESS continues to ease downward from record high marks of the two-front war as the nation adjusts to a one-front war production basis and struggles to speed up reconversion of facilities for normal peacetime output.

Settling of business activity in ordinary times would result in pessimism but today since the downtrend from an abnormal war production high lends some encouragement that resumption of civilian production will be greatly facilitated there is a tendency to view the outlook with not a little optimism despite the fact increasing unemployment is expected over the summer months as plants close out their current war contracts and prepare to resume peacetime production.

INDUSTRIAL PRODUCTION — The downtrend in activity in munitions plants resulted in a decline in May of the Federal Reserve Board's seasonally adjusted index of industrial production to 227 per cent of the 1935-1939 average as compared with 231 in April.

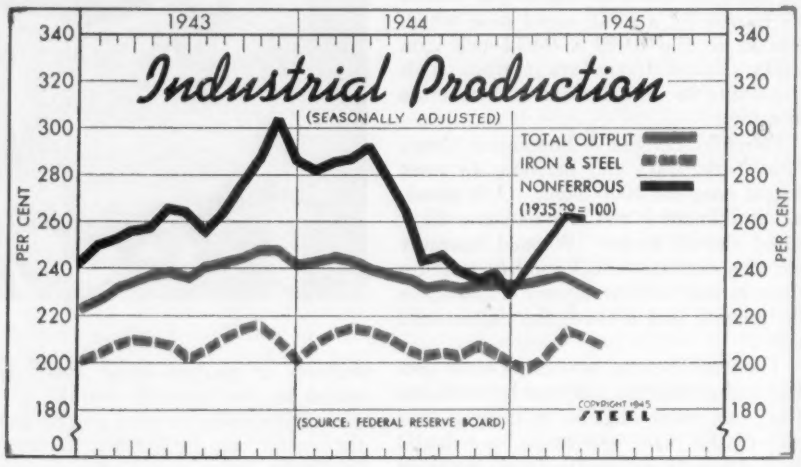
Most of the decrease in munitions plants was accounted for by continued reduction in operations at shipyards, although there were small decreases in activity in the machinery and aircraft and other transportation equipment industries. The decline in aircraft was in accordance with reduction in schedules made prior to V-E Day.

STEEL—As war production eases downward, the steel industry is booking unrated civilian steel orders but is making no delivery promises on these tonnages. As a matter of fact considerable doubt is expressed by steel leaders that substantial tonnages of unrated steel will be available in third quarter although it is recognized that conditions may change suddenly and the outlook for civilian steel supply improve correspondingly.

WAR COSTS—Despite a downward trend in war production, war expenditures in May were somewhat higher than in April and in the latest week for which reports are available for June were up 9 per cent over the preceding week. However, if final figures show that the weekly average for the first three weeks of June is maintained for the rest of that month the total war expenditures for June will be under those of May.

COMMODITY PRICES—The Bureau of Labor Statistics' index of all commodity prices in primary markets in the latest week remained unchanged at 106.0 per cent of the 1926 level. Wholesale prices of raw materials rose two-tenths of 1 per cent.

FABRICATED STRUCTURAL STEEL—May bookings of fabricated structural steel for bridge and building construction decreased 52 per cent from April. However, a similar decline was registered in the like period last year.



Federal Reserve Board's Production Indexes
(1935-39=100)

	Total Production			Iron, Steel			Nonferrous		
	1945	1944	1943	1945	1944	1943	1945	1944	1943
January	234	243	227	197	208	204	240	281	250
February	236	244	232	202	212	208	257	285	252
March	235	242	235	210	214	210	265	286	256
April	231	239	237	206	213	209	264	292	257
May	227	237	238	204	210	208	...	279	266
June	...	235	236	...	204	201	...	264	264
July	...	231	240	...	202	204	...	243	256
August	...	232	242	...	203	210	...	245	264
September	...	231	244	...	202	214	...	239	277
October	...	232	247	...	206	215	...	236	286
November	...	232	247	...	201	209	...	239	304
December	...	232	241	...	198	200	...	229	277
Average	...	236	239	...	206	208	...	260	267

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	90	88	93.5	97.5
Electric Power Distributed (million kilowatt hours)	4,350†	4,348	4,330	4,325
Bituminous Coal Production (daily av.—1000 tons)	1,975	2,012	1,893	2,029
Petroleum Production (daily av.—1000 bbls.)	4,898	4,888	4,867	4,583
Construction Volume (ENR—unit $1,000,000)	$41.9	$59.2	$35.0	$28.0
Automobile and Truck Output (Ward's—number units)	19,490	19,600	21,010	19,385

*Dates on request.

TRADE				
Freight Carloadings (unit—1000 cars)	875†	873	882	881
Business Failures (Dun & Bradstreet, number)	17	13	12	25
Money in Circulation (in millions of dollars)‡	$26,536	$26,533	$26,399	$22,293
Department Store Sales (change from like week a year ago)‡	+14%	+4%	−1%	+2%

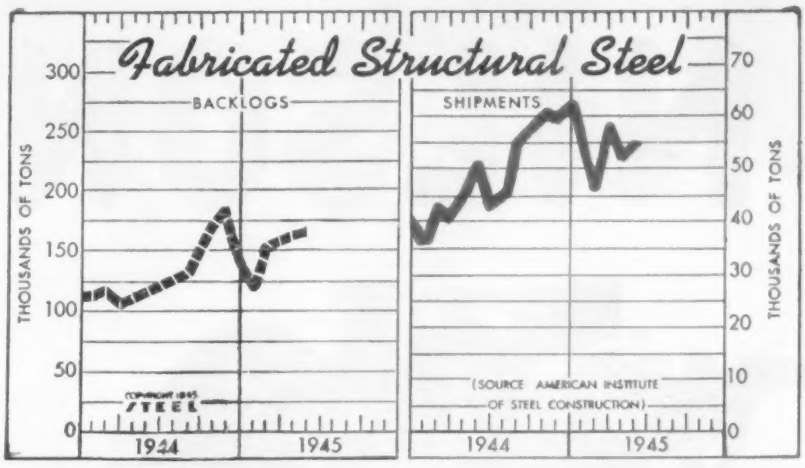
†Preliminary. ‡Federal Reserve Board.

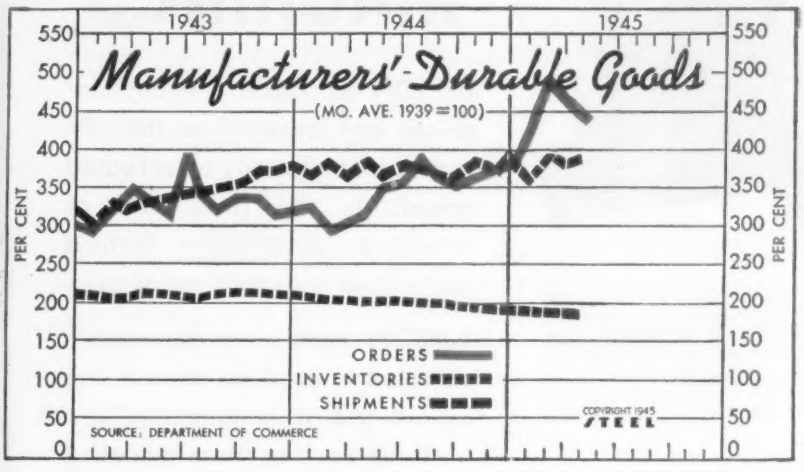
Fabricated Structural Steel

(1000 tons)

	Shipments			Backlogs		
	1945	1944	1943	1945	1944	1943
Jan.	54.5	35.2	91.9	124.4	113.1	339.1
Feb.	47.4	42.9	90.8	151.6	117.6	321.0
Mar.	57.6	41.4	94.0	153.3	106.3	299.8
Apr.	52.1	44.5	86.6	162.5	111.2	272.5
May	54.4	50.7	78.9	165.7	116.3	220.6
June	...	43.0	68.4	....	122.7	207.1
July	...	45.3	56.8	....	125.4	201.8
Aug.	...	55.2	50.2	....	130.4	195.6
Sept.	...	57.5	51.8	....	151.1	208.1
Oct.	...	61.6	80.1	....	174.4	274.0
Nov.	...	59.4	42.7	....	184.2	134.6
Dec.	...	61.3	39.6	....	142.5	113.0

Source: American Institute of Steel Construction. Figures represent members' reports only.





Index of Manufacturers' Durable Goods

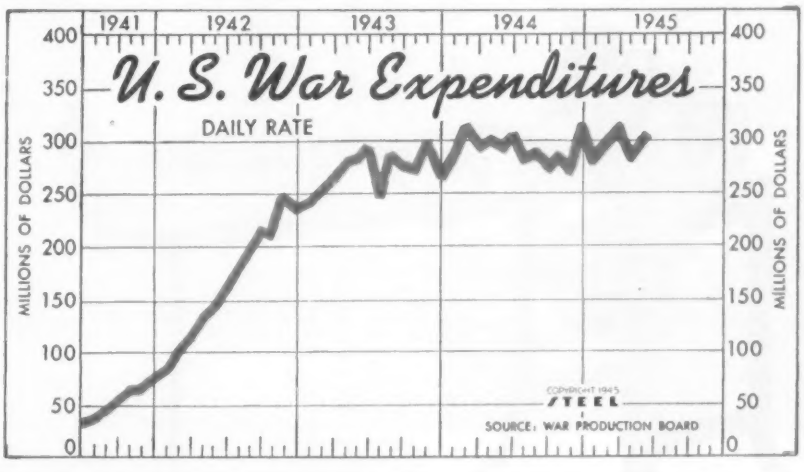
(Mo. Ave. 1939 = 100)

	Orders		Shipments		Inventories	
	1945	1944	1945	1944	1945	1944
Jan.	427	332	354	364	190	212
Feb.	481	294	394	384	189	209
Mar.	463	310	381	377	189	207
April	446	325	387	389	189	205
May	...	352	...	371	...	204
June	...	359	...	383	...	204
July	...	393	...	373	...	202
Aug.	...	367	...	366	...	201
Sept.	...	350	...	372	...	199
Oct.	...	367	...	380	...	197
Nov.	...	372	...	374	...	195
Dec.	...	378	...	390	...	192
Ave.	...	350	...	377	...	202

War Expenditures

(millions)

	1945		1944	
	Monthly Expenditures	Daily Rate	Monthly Expenditures	Daily Rate
Jan.	$7,519	$278.4	$7,416	$285.2
Feb.	6,985	290.2	7,808	312.3
March ...	8,318	308.1	7,948	294.4
April ...	7,045	281.8	7,493	299.7
May	8,166	302.5	7,918	293.3
June	....	....	7,957	306.0
July	....	....	7,355	282.9
Aug.	....	....	7,798	288.8
Sept.	....	....	7,104	273.2
Oct.	....	....	7,447	286.4
Nov.	....	....	7,095	272.9
Dec.	....	....	7,835	313.4
Total	....	....	91,174	Ave. 292.2



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$15,055	$10,835	$11,109	$11,766
Federal Gross Debt (billions)	$250.4	$242.8	$238.2	$190.6
Bond Volume, NYSE (millions)	$56.3	$60.5	$43.6	$53.4
Stocks Sales, NYSE (thousands)	10,088	9,254	6,407	8,644
Loans and Investments (billions)†	$58.9	$58.3	$57.2	$50.4
United States Gov't. Obligations Held (millions)†	$43,676	$43,296	$42,853	$37,259

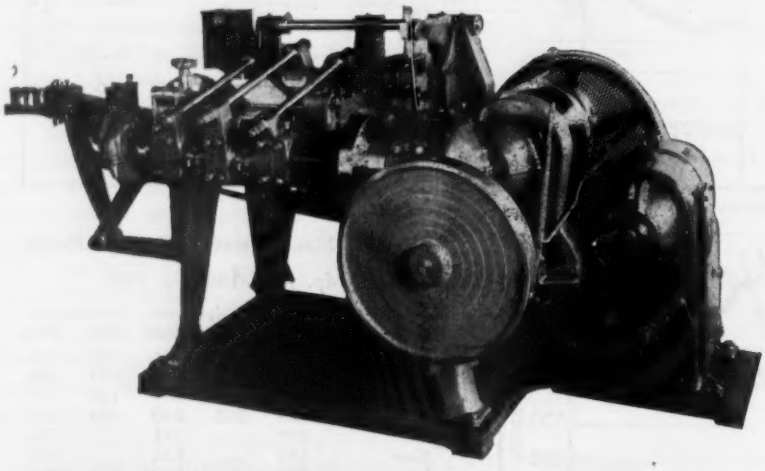
†Member banks, Federal Reserve System.

PRICES

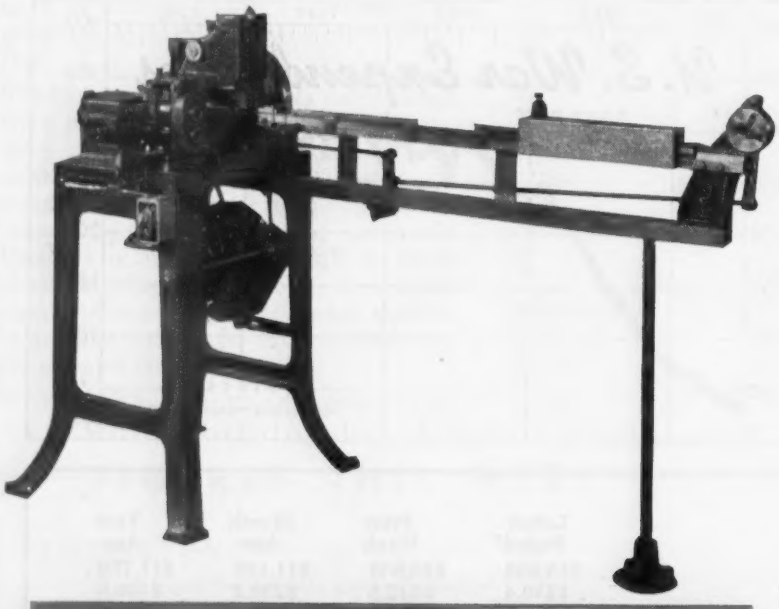
STEEL's composite finished steel price average	$58.27	$58.27	$58.27	$56.73
All Commodities†	106.0	106.0	105.8	103.7
Industrial Raw Materials†	119.0	118.8	117.9	113.1
Manufactured Products†	102.0	102.0	102.1	101.0

†Bureau of Labor's Index, 1926 = 100.

NILSON



The NILSON Automatic Metal Wire Forming Machine is sturdy, solid and compact. It is highly efficient and a practical machine for forming wire and punching patterns from ribbon stock.



The NILSON Automatic Staple Forming Machine insures speed without impairing accuracy. Special attachments and patented features contribute to this fact. It is of the plunger type and a special feature is the production of chisel-point staples.

WIRE AND METAL FORMING MACHINES

NILSON automatic forming machines are answers to the demands for uniformity at increased speeds in the production of thousands of different formed parts from wire and metal strip.

NILSON makes various models adapted to produce parts of this nature but it is amazing how versatile each of these models is and how many different products can be turned out on a single machine.

NILSON automatic wire and metal forming machines are positive in automatic straightening and feeding, fast in operation and easy to tool up. Fifty years of experience in special machine building are behind these products and sound engineering practice dictates every design. If you produce wire and small metal parts, investigate; send for bulletin describing these and other NILSON products such as wire straighteners, wire reels, frame bending machines and special presses.

THE A. H. NILSON MACHINE CO. BRIDGEPORT, CONN.

Cut slag-handling costs – use

Johnston

BLAST FURNACE AND OPEN HEARTH TYPE

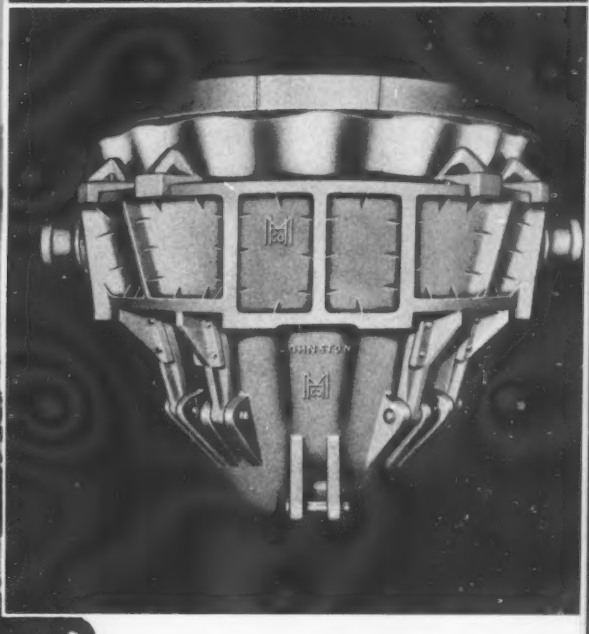
cinder pots

We don't sell "just castings"—we have no stock pots—Each Johnston Corrugated Cinder Pot is individually engineered to a specific plant condition . . . and we keep complete records of the chemical, metallurgical and physical properties of every one of them—actual plant performance where it's available.

We don't know *all* the answers but we *do* manage to lick a lot of problems. Our expanding rim (cast integral) for instance is generally acknowledged to be the most important cinder pot development since the advent of the Johnston Pot Support. This and other improvements has resulted in a 100% adoption of the Johnston Pot by an impressive number of leading plants . . . so we feel pretty certain that we can cut your slag-handling costs.

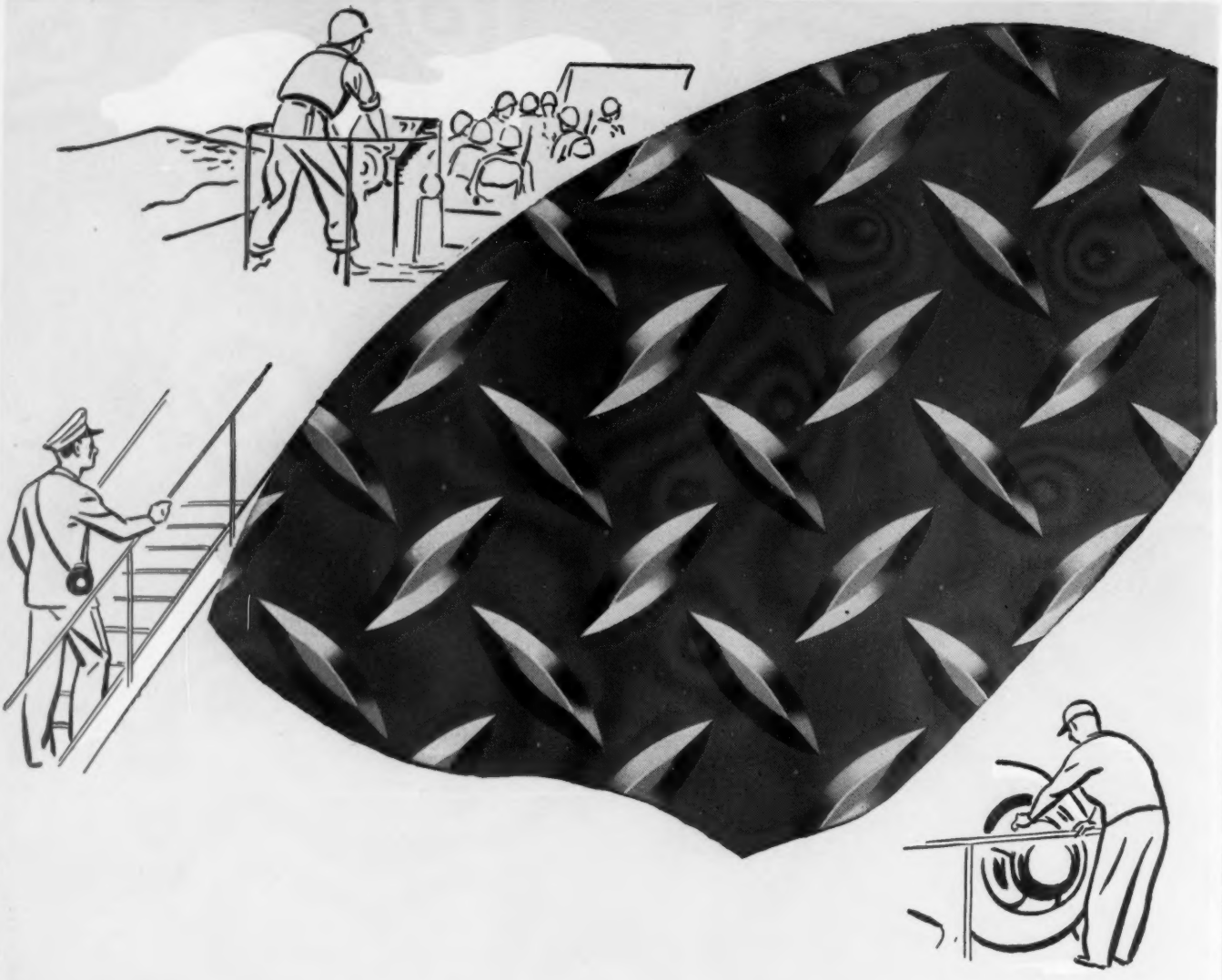
1803

Mackintosh-Hemphill Company is the exclusive licensee for the manufacture and sale of Johnston Patented Corrugated Pots and Supports.



MACKINTOSH-HEMPHILL CO.

PITTSBURGH AND MIDLAND, PA.



A sailor on a landing barge . . .

A watchman on a fire escape . . .

An engineer in a power plant . . .

A stevedore on a loading platform . . .

Every time he puts his foot *down*, forty Diamond Treads are there — reaching *up* to give him extra traction; to hold him against slipping in any direction. That is what "A.W." Super-Diamond Floor Plate means to workers in industrial plants, refineries, railroads, on ship-board. Easy to clean. Quick to drain. Toughest use will not damage it. Can be installed overnight without disturbing production. Write for catalog.

ALAN WOOD STEEL COMPANY

SINCE 1826 :: CONSHOHOCKEN, PENNSYLVANIA :: District Offices and Representatives:

Philadelphia New York Boston Atlanta Buffalo Chicago Cincinnati Cleveland Denver Detroit Houston St. Paul New Orleans Pittsburgh Roanoke Los Angeles San Francisco Seattle Montreal

War Cancellations Fail To Relieve Pressure on Mills

Sheets still most heavily sold . . . Duplicate buying obscures market . . . Shell cutback effect to be gradual . . . Steel production up after strikes

IN SPITE of easing war requirements the steel supply situation continues tight with deliveries well extended on all products except plates and some relatively minor products, pressure for sheets and strip being particularly strong.

An undesirable condition is developing in the sheet market as related to unrated orders. It is reported many buyers are placing duplicate orders with several mills in an effort to obtain desired delivery. As a result much of this tonnage may be canceled later, with considerable market confusion resulting. Some producers are considering proposals to Washington that sheets and strip be taken off the "free" list entirely unless this duplication in orders can be stopped.

Proposed cutback of 50 per cent in the Army shell program, recently announced, may not be fully felt for some time, as it is to be undertaken gradually over three months. Meanwhile, carbon bar schedules, which would be first to reflect such cutbacks, are much extended, with little tonnage available for third quarter and most of that in smaller sizes. Alloy bar schedules are fairly easy, with electric furnace grades offered in August and open-hearth grades in September.

With aid of unrated orders plate producers expect production to average about 600,000 tons per month in third quarter. This is slightly higher than recent predictions but production continues downward. The third quarter monthly estimate compares with about 810,000 tons actually produced in March, the peak of the year. There also has been a steady decline in plates produced on strip mills, with about 70,000 tons in June and 50,000 tons likely to be made in July.

Plate tonnage is hit hardest by decline in merchant ship requirements. About 100,000 tons will be rolled for this purpose in third quarter, compared with 660,000 tons in second quarter and a far larger tonnage a year ago, when these needs were at peak.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended June 30	Change	Same Week 1944	Same Week 1943
Pittsburgh	88	—1	90	91
Chicago	95.5	None	99	98.5
Eastern Pa.	90	None	94	93
Youngstown	90	None	95	94
Wheeling	90.5	None	97	86
Cleveland	93	+1.5	92.5	90
Buffalo	93	+2.5	90.5	93
Birmingham	95	+30	95	95
New England	84	—2	89	93
Cincinnati	89	+34	72	92
St. Louis	75	None	79.5	95
Detroit	83	+8	83	92
Estimated national rate	92	+2	*96	*92

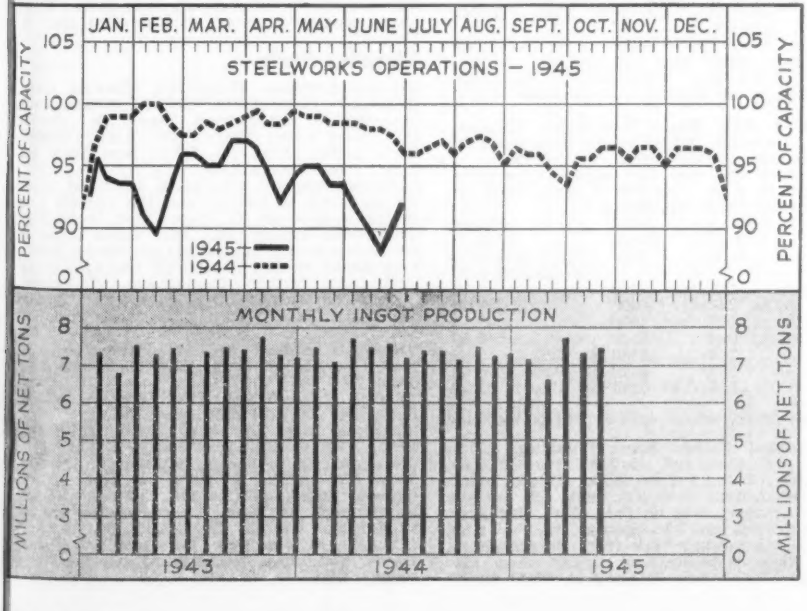
*Based on steelmaking capacities as of these dates.

Return of strikers to their jobs at several points last week allowed steel production to be resumed and the estimated national rate rose 2 points to 92 per cent of capacity. Cincinnati gained 34 points to 89 per cent, Birmingham 30 points to 95 and Detroit 8 points to 83 per cent, all in rebound from strikes. Cleveland rose 1½ points to 93 and Buffalo 2½ points to 93. New England lost 2 points to 84 and Pittsburgh was down 1 point to 88 per cent. Rates were unchanged as follows: Chicago 95½, Youngstown 90, Wheeling 90½, eastern Pennsylvania 90, St. Louis 75.

Many foundries are observing this week for vacation and inventory taking, in spite of pressure for castings. Third quarter demand for pig iron is for about the same total as in previous periods and producers are shipping their entire make, no stocks being accumulated. The 30-day restriction on inventory is being continued on suggestion of the industry advisory committee. Labor shortage continues to restrict foundries from accepting much offered business. Cutbacks in castings for armament have been replaced by heavy orders for carbuilders and other civilian consumers.

Strength is increasing in the scrap market and ceilings apply in practically all districts on steelmaking grades and cast, the latter being consistently scarce. Even borings and turnings, which have been weak and far below ceilings, continue to advance as demand persists and production declines. A number of large consumers who had been out of the market recently have started buying and considerable tonnage has been contracted in the past week. Supply is fairly equal to demand, in spite of difficulty in collection and preparation, on account of labor shortage. Tightness in pig iron is one factor in the increasing strength in scrap.

Average composite prices of steel and iron products are unchanged, at OPA ceilings. Finished steel composite is $58.27, semifinished steel $37.80, steelmaking pig iron $24.05 and steelmaking scrap $19.17.



COMPOSITE MARKET AVERAGES

	June 30	June 23	June 16	One Month Ago May, 1945	Three Months Ago Mar., 1945	One Year Ago June, 1944	Five Years Ago June, 1940
Finished Steel	$58.27	$58.27	$58.27	$57.73	$57.55	$56.73	$56.73
Semifinished Steel	37.80	37.80	37.80	36.45	36.00	36.00	36.00
Steelmaking Pig Iron	24.05	24.05	24.05	24.05	23.55	23.05	22.05
Steelmaking Scrap	19.17	19.17	19.00	19.13	19.17	19.17	19.15

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	June 30, 1945	May, 1945	Mar., 1945	June, 1944
Steel bars, Pittsburgh	2.25c	2.17c	2.15c	2.15c
Steel bars, Chicago	2.25	2.17	2.15	2.15
Steel bars, Philadelphia	2.57	2.49	2.47	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.25	2.22	2.20	2.10
Plates, Philadelphia	2.30	2.26	2.25	2.15
Plates, Chicago	2.25	2.22	2.20	2.10
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.70	3.65	3.65	3.50
Sheets, hot-rolled, Gary	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.70	3.65	3.65	3.50
Bright bess., basic wire, Pittsburgh	2.75	2.64	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.90	2.82	2.80	2.55

Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$36.00	$34.50	$34.00	$34.00
Slabs, Pittsburgh, Chicago	36.00	34.50	34.00	34.00
Rerolling billets, Pittsburgh	36.00	34.50	34.00	34.00
Wire rods, No. 5 to ⅜-inch, Pitts	2.15	2.05	2.00	2.00

Pig Iron	June 30, 1945	May, 1945	Mar., 1945	June, 1944
Bessemer, del. Pittsburgh	$26.19	$26.19	$26.19	$25.19
Basic, Valley	24.50	24.50	24.50	23.50
Basic, eastern del. Philadelphia	26.34	26.34	26.34	25.34
No. 2 fdry., del. Pitts., N.&S. Sides	25.69	25.69	25.69	24.69
No. 2 foundry, Chicago	25.00	25.00	25.00	24.00
Southern No. 2, Birmingham	21.38	21.38	21.38	20.38
Southern No. 2 del. Cincinnati	25.30	25.30	25.30	24.30
No. 2 fdry., del. Phila.	26.34	26.34	26.34	25.34
Malleable, Valley	25.00	25.00	25.00	24.00
Malleable, Chicago	25.00	25.00	25.00	24.00
Lake Sup., charcoal, del. Chicago	37.34	37.34	37.34	37.34
Gray forge, del. Pittsburgh	25.19	25.19	25.19	24.19
Ferromanganese, del. Pittsburgh	140.33	140.33	140.33	140.33

Scrap				
Heavy melting steel, No. 1 Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke				
Connellsville, furnace, ovens	$7.50	$7.00	$7.00	$7.00
Connellsville, foundry ovens	8.25	7.75	7.75	7.75
Chicago, by-product fdry., del.	13.35	13.35	13.35	13.35

STEEL, IRON RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941, Feb. 4, 1942 and May 21, 1945. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individual companies are noted in the table. Finished steel quoted in cents per pound.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill Kaiser Co. Inc., $43, f.o.b. Pacific ports.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop., $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $36; Detroit, del. $38; Duluth (bll) $38; Pac. Ports, (bll) $48. (Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., Kaiser Co. Inc., $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $42. Detroit, del. $44; Duluth, billets, $44; forg. bll. f.o.b. Pac. ports, $54.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co., Kaiser Co. Inc., $64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.00; 18 in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich. (Kaiser Co. Inc., $76.64, f.o.b. Los Angeles).

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54; del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $36. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—⅜ in. inclusive, per 100 lbs., $2.15. Do., over ⅜—$\frac{47}{64}$-in., incl., $2.30; Galveston, base, 2.25c and 2.40c, respectively. Worcester add $0.10; Pacific ports $0.50. (Pittsburgh Steel Co., $0.20 higher.)

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3": Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.25c; Duluth, base 2.35c; Mahoning Valley 2.32½c; Detroit, del. 2.35c; Eastern Mich. 2.40c; New York del. 2.59c; Phila. del. 2.57c; Gulf Ports, dock 2.62c; Pac. ports, dock 2.90c. (Calumet Steel Division, Borg-Warner Corp., and Joslyn Mfg. & Supply Co. may quote 2.35c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St. Louis.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.80c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.70
		4100 (.20-.30 Mo)	0.75
2300	1.70	4300	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.85	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70c; Toledo 2.80c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City. New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.

Iron Bars: Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00c, double ref., 6.25c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granite City, base 2.30c; Detroit del. 2.30c; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del. 2.44c; Pacific ports 2.75c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.35c on hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.70c; Granite City, base 3.80c; New York del. 3.94c; Phila. del 3.87c; Pacific ports 4.25c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.36c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific ports 4.25c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.25c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 2.85c; Granite City, base 2.95c; Detroit, del. 2.95c; eastern, Mich. 3.00c; Pacific ports 3.50c; **20-gage;** Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.30c	4.05c	3.30c
Armature	3.65c	4.40c	3.75c
Electrica	4.15c	4.90c	4.25c
Motor	5.05c	5.80c	5.15c
Dynamo	5.75c	6.50c	5.85c
Transformer			
72	6.25c	7.00c	.....
65	7.25c	8.00c	.....
58	7.75c	8.50c	.....
52	8.55c	9.30c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb base box, 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c.

(Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c, f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.50c; Pacific ports, 4.15c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa., may quote carbon steel shapes at 2.35c at established basing points and 2.50c, Phoenixville, for export; Sheffield Steel Corp., 2.55c f.o.b. St. Louis. Geneva Steel Co., 3.25c, Pac. ports); Kaiser Co. Inc., 3.20c f.o.b. Los Angeles).

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester, $1 for Duluth).

Bright basic, bessemer wire 2.75c
Spring wire 3.35c
(Pittsburgh Steel Co., 0.20c higher.)

Wire Products to the Trade:

Standard and Cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Duluth $2.90; galvanized, $2.55; Pac. ports ..... $3.40 and $3.05
Annealed fence wire, 100-lb., Pittsburgh, Chicago, Cleveland 3.20c
Galvanized fence wire, 100 lb., Pittsburgh, Chicago, Cleveland 3.55c
Woven fence, 15½ gage and heavier, per base column ..... .67c
Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted barbless wire, column 70.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	¾	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	54½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-19	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. Sizes	B.W.G	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	...
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $45.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates, $46 net ton, base, Standard spikes, 3.25c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

Tung.	Chr.	Van.	Moly.	Pitts. base per lb.
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
.....	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
‡321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F.	19.50	22.50	29.50	18.75	24.50
440A.	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	‡‡18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices, wasters 75%, waste wasters 65% except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

Carriage and Machine

½ x 6 and smaller ..... 65½ off
Do., ⅝ and ¾ x 6-in. and shorter ... 63½ off
Do., ⅞ to 1 x 6-in. and shorter ..... 61 off
1⅛ and larger, all lengths ..... 59 off
All diameters, over 6-in. long ..... 59 off
Tire bolts ..... 50 off
Step bolts ..... 56 off
Plow bolts ..... 65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex	U.S.S.	S.A.E.
⅞-inch and less	62	64
½-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	

Hexagon Cap Screws

Upset 1-in., smaller ..... 64 off
Milled 1-in., smaller ..... 60 off

Square Head Set Screws

Upset, 1-in., smaller ..... 71 off
Headless, ¼-in., larger ..... 60 off
No. 10, smaller ..... 70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural 3.75c
⅞-inch and under ..... 65-5 off
Wrought Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l. .... $2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*7.50
Connellsville, foundry	8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75
By-Product Foundry	
Kearney, N. J., ovens	12.88
Chicago, outside delivered	12.88
Chicago, delivered	13.38
Terre Haute, delivered	13.10
Milwaukee, ovens	13.38
New England, delivered	14.
St. Louis, delivered	†13.38
Birmingham, delivered	16.
Indianapolis, delivered	13.10
Cincinnati, delivered	12.88
Cleveland, delivered	12.80
Buffalo delivered	13.00
Detroit, delivered	13.38
Philadelphia, delivered	12.88

*Operators of hand-drawn ovens using trucked coal may charge $8.00, effective May 26 1945. †13.85 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do., tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars 9400 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.144[11]	4.715	6.012[30]	6.012[30]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.103[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.103[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[15]	4.872[25]	4.072[21]	4.772	5.816[33]	5.860[33]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[25]	4.052[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[30]	4.041[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[14]	4.165[21]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[15]	4.40[10]	3.75[21]	4.669	5.60[33]	5.75[33]
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.50[1]	4.65[15]	4.30[10]	3.65[21]	4.35	5.60[33]	5.75[33]
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[13]	4.40[24]	3.75[21]	.....	.....	.....
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[13]	4.30[24]	3.65[21]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[13]	4.40[24]	3.75[21]	4.45[21]	5.60[33]	5.65[33]
Cleveland (country)	3.25[1]	.....	3.30[1]	.....	3.25[1]	3.50[1]	3.50[1]	.....	4.30[24]	3.65[21]	4.35[21]	.....	.....
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[12]	4.500[26]	3.800[21]	4.659	5.93[33]	5.93[33]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.165[1]	5.765[1]	3.865[1]	4.215[1]	4.215[1]	5.608[19]	5.443[26]	4.443[12]	.....	.....	.....
Omaha (country, base)	4.015[1]	4.065[1]	4.065[1]	5.665[1]	3.765[1]	4.115[1]	4.115[1]	5.508[19]	.....	.....	.....	.....	.....
Cincinnati	3.611[1]	6.391[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[12]	4.475[24]	4.011[21]	4.711	6.10	6.20
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[13]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[16]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[15]	4.20[24]	3.75[21]	4.65	5.75[33]	5.85[33]
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[15]	4.337[24]	3.887[21]	4.787	5.987[33]	6.087[33]
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[15]	4.568[24]	3.98[21]	4.78	6.08[33]	6.18[33]
St. Paul	3.76[3]	3.81[3]	3.81[3]	5.41[3]	3.51[3]	3.86[3]	3.86[3]	5.257[15]	4.46[24]	4.361[21]	5.102	6.09[33]	6.19[33]
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[1]	5.172[15]	4.347[24]	4.031[21]	4.931	6.131[33]	6.231[33]
Memphis, Tenn.	4.015[5]	4.065[5]	4.065[5]	5.78[5]	3.965[5]	4.215[5]	4.215[5]	5.265[15]	4.78[24]	4.33[21]	.....	.....	.....
Birmingham	3.50[1]	3.55[1]	3.55[1]	5.903[1]	3.45[1]	3.70[1]	3.70[1]	4.75[15]	4.852[24]	4.54	5.215	.....	.....
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	4.058[4]	4.20[4]	4.20[4]	5.25[36]	5.079[10]	4.60[21]	5.429	.....	.....
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.763[3]	4.313[3]	4.313[3]	5.313[36]	4.10[10]	3.65[23]	.....	.....	.....
Los Angeles	4.40[4]	4.65[4]	4.95[4]	7.20[4]	5.00[4]	4.95[4]	6.75[4]	6.00[13]	7.20[6]	5.583[22]	5.613	5.85[33]	5.95[33]
San Francisco	4.15[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	5.75[7]	6.35[18]	7.30[15]	5.333[21]	7.333	8.304[33]	8.404[33]
Portland, Oreg.	4.45[37]	4.45[37]	4.75[37]	6.50[37]	4.65[37]	4.75[37]	6.30[37]	5.75[18]	6.60[15]	5.533[15]	.....	.....	.....
Tacoma	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[18]	7.60[15]	5.783[21]	.....	.....	8.00[33]
Seattle	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[13]	7.05[15]	5.783[21]	.....	.....	8.00[33]

*Basing point cities with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 18 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton. 51½% (Natural) Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80

Brazilian—nominal

44% 2.5:1 lump	33.65
48% 3:1 lump	43.50

Rhodesian

45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50

Domestic (seller's nearest rail)

48% 3:1	52.80

less $7 freight allowance

Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 248, effective as of May 15. Price at basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, at dock most favorable to the buyer.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furnace Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
NE 8612	.10-.15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15	$23.00
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	24.00
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.30	26.00
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.15	23.00
NE 9830	.28-.33	.70-.90	.20-.35	.70-.90	.85-1.15	.20-.30	1.30	26.00	1.80	36.00
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$26.00	$25.50	$27.00	$26.50
Newark, N. J., del.	27.53	27.03	28.53	28.03
Brooklyn, N. Y., del.	28.50	.....	.....	29.00
Birdsboro, Pa., base	26.00	25.50	27.00	26.50
Birmingham, base	‡21.38	‡20.00	26.00	.....
Baltimore, del.	26.61	.....	.....	.....
Boston, del.	26.12	.....	.....	.....
Chicago, del.	25.22	.....	.....	.....
Cincinnati, del.	25.06	23.68	.....	.....
Cleveland, del.	25.12	24.24	.....	.....
Newark, N. J., del.	27.15	.....	.....	.....
Philadelphia, del.	26.46	25.96	.....	.....
St. Louis, del.	25.12	24.24	.....	.....
Buffalo, base	25.00	24.00	26.00	25.50
Boston, del.	26.50	26.00	27.50	27.00
Rochester, del.	26.53	.....	27.53	27.03
Syracuse, del.	27.08	.....	28.08	27.58
Chicago, base	25.00	24.50	25.50	25.00
Milwaukee, del.	26.10	25.60	26.60	26.10
Muskegon, Mich., del.	28.19	.....	.....	28.19
Cleveland, base	25.00	24.50	25.50	25.00
Akron, Canton, O., del.	26.39	25.89	26.89	26.39
Detroit, base	25.00	24.50	25.50	25.00
Saginaw, Mich., del.	27.31	26.81	27.81	27.31
Duluth, base	25.50	25.00	26.00	25.50
St. Paul, del.	27.63	27.13	28.13	27.63
Erie, Pa., base	25.00	24.50	26.00	25.50
Everett, Mass., base	26.00	25.50	27.00	26.50
Boston, del.	26.50	26.00	27.50	27.00
Granite City, Ill., base	25.00	24.50	25.50	25.00
St. Louis, del.	25.50	25.00	.....	25.50
Hamilton, O., base	25.00	24.50	.....	25.00
Cincinnati, del.	25.44	25.61	.....	26.11
Neville Island, Pa., base	25.00	24.50	25.50	25.00
§Pittsburgh, del. No. & So. sides	25.69	25.19	26.19	25.69
Provo, Utah, base	23.00	22.50	.....	.....
Sharpsville, Pa., base	25.00	24.50	25.50	25.00
Sparrows Point, base	26.00	25.50	.....	.....
Baltimore, del.	26.99	.....	.....	.....
Steelton, Pa., base	...	25.50	...	26.50
Swedeland, Pa., base	26.00	25.50	27.00	26.50
Philadelphia, del.	26.84	26.34	.....	27.34
Toledo, O., base	25.00	24.50	25.50	25.00
Youngstown, O., base	25.00	24.50	25.50	25.00
Mansfield, O., del.	26.94	26.44	27.44	26.94

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. ‡For phosphorus 0.70% or over deduct 38 cents. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent	(base)		$30.50
6.51-7.00	$31.50	9.01- 9.50	36.50
7.01-7.50	32.50	9.51-10.00	37.50
7.51-8.00	33.50	10.01-10.50	38.50
8.01-8.50	34.50	10.51-11.00	39.50
8.51-9.00	35.50	11.01-11.50	40.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.05 Phos., 0.40 Sulphur, 1.00% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn.	$34.00
Chicago, del.	37.34

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn.	$28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn.	33.00

Gray Forge

Neville Island, Pa.	$24.50
Valley base	24.50

Low Phosphorus

Basing points: Birdsboro, Pa., $30.50; Steelton, Pa., and Buffalo, N. Y., 30.50 base; 31.74, del., Philadelphia. Intermediate phos., Central Furnace, Cleveland, $27.50

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Duty	
Pa., Mo., Ky.	$68.50
First Quality	
Pa., Ill., Md., Mo., Ky.	54.40
Alabama, Georgia	54.40
New Jersey	59.35
Ohio	47.70
Second Quality	
Pa., Ill., Md., Mo., Ky.	49.35
Alabama, eorgia	40.30
New Jersey	52.00
Ohio	38.15

Malleable Bung Brick

All bases	63.45

Silica Brick

Pennsylvania	54.40
Joliet, E. Chicago	62.45
Birmingham, Ala.	54.40

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	32.90
Wire cut	30.80

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	28.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net ton, carloads CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. (After Aug. 29 base price any grade $30.) war chemicals.

Ferroalloy Prices

Ferromanganese (standard) 78-82% c.l. gross ton, duty paid, $135; add $6 for packed c.l., $10 for ton, $13.50 less-ton, f.o.b. cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer; Rockdale or Rockwood, Tenn., where Tennessee Products Co. is seller; Birmingham, Ala., where Sloss-Sheffield Steel & Iron Co. is seller; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%; delivered Pittsburgh, $140.33.

Ferromanganese (Low and Medium Carbon); per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb. to c.l., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21% carlots per gross ton, Palmerton, Pa., $36; 16-19%, $35.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l. 80c; central, 81c and 82.50c; western 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R.R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l., 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome: Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l., max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65c for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome. high carbon: (Chrom. 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium; 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silcaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed; 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract, carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western, spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max., sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract, ton lots, $1.89, less, $2.01, eastern, freight allowed; $1.903 and $2.623 central, $1.935 and $2.055 western, spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot, up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide approx. 2%, or Red Cake: Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed, per pound vanadium oxide contained; contract cariots, $1.105, less cariots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; cast: Contract, ton lots or more $1.80, less, $2.30, eastern zone, freight allowed, per pound of metal; $1.809 and $2.309 Central, $1.849 and $2.349, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, cariots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.05c, 17.35c and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, cariot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, cariots, bulk .0605c, packed .063c, tons .0655c, less .068c, eastern, freight allowed; .063c, .0655c, .0755c and .078c, central; .066c, .0685c, .0855c and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2¼ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c, 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

Manganese Metal: (96 to 98% manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 36c, 2000 lb. to c.l., 38c, central, 36.25c, and 39c; western 36.55c and 41.05c; 95 to 97% manganese, max. 2.50% iron, eastern, bulk, c.l., 34c; 2000 to c.l., 35c; central 34.25c and 36c; western, 34.55c and 38.05c; f.o.b. shipping point, freight allowed.

Ferrotungsten: Spot, cariots, per lb. contained tungsten, $1.90; freight allowed as far west as St. Louis.

Tungsten Metal Powder: spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.15% net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium.

Bortam: Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: 12-15%, per lb. of alloy, eastern contract, cariots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, Eastern, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.75c; ton lots 6.50c. Spot ½ cent higher.

Simanal: (Approx. 20% each Si., Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

Borosil: 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Bo., f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 150 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No.1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	14.75
Mixed Borings, Turnings	10.50-11.00
Machine Shop Turnings	10.50-11.00
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	17.50

Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices.)

No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turnings	8.50
Mixed Borings, Turnings	8.50
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	11.00-11.50
Short Shovel Turnings	14.50-15.00
Mixed Borings, Turnings	12.50-13.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.50-14.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	$14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	5.50- 6.00
Mixed Borings, Turnings	5.50- 6.00
Short Shovel Turnings	7.50- 8.50
Chemical Borings	13.81
Low Phos. Clippings	16.56
No. 1 Cast	20.06
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

Boston Differential 99 cents higher, steel-making grades; Providence $1.09 higher.

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel, Turnings	16.00
Mach. Shop Turnings	14.00
Mixed Borings, Turnings	14.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	21.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$21.00
No. 1 Heavy Melt Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	15.00-15.50
Cast Iron Borings	14.00-14.50
Machine Shop Turnings	11.50-12.50
Low Phos. Plate	21.00-22.00

MANSFIELD, O.:

(Delivered consumer's plant)

Machine Shop Turnings	11.00-11.50

BIRMINGHAM:

(Delivered consumer's plant)

Billet, Forge Crops	$22.00
Structural, Plate Scrap	19.00
Scrap Rails, Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn.	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	12.50-13.00
Mix. Borings, Sht. Turn.	13.25-13.75
Short Shovel Turnings	14.00-14.50
Cast Iron Borings	13.25-13.75
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00

(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)

BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	12.00
Short Shovel Turnings	15.00
Mixed Borings, Turn.	12.00
Cast Iron Borings	14.00
Low Phos.	21.75

DETROIT:

(Dealers' buying prices)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	7.00- 7.50
Short Shovel. Turnings	10.50-11.00
Cast Iron Borings	9.50-10.00
Low Phos Plate	19.32-19.82
No. 1 Cast	20.00
Heavy Breakable Cast	13.50-14.00

ST. LOUIS:

(Delivered consumer's plant)

Heavy Melting	$17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	9.00
Rerolling Rails	21.00
Steel Car Axles	21.50-22.00
Steel Rails, 3 ft.	21.50
Steel Angle Bars	21.00
Cast Iron Wheels	20.00
No. 1 Machinery Cast	20.00
Railroad Malleable	22.00
Breakable Cast	16.50
Stove Plate	19.00
Grate Bars	15.25
Brake Shoes	15.25

(Cast grades f.o.b. shipping point)

Stove Plate	18.00

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.50
No. 2 Heavy Melt. Steel	18.50
No. 1 Comp. Bundles	18.50
No. 2 Comp. Bundles	18.50
Machine Turnings	7.50- 8.00
Shoveling Turnings	9.50-10.00
Cast Iron Borings	9.50-10.00
Mixed Borings, Turnings	8.50- 9.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-21.50
Scrap Rails	20.50-21.00
Stove Plate	16.00-16.50

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14.00
No. 2 Heavy Melt. Steel	13.00
No. 1, 2 Deal. Bundles	12.00
Machine Turnings	4.50
Mixed Borings, Turnings	4.00
No. 1 Cast	20.00

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$15.50
No. 2 Heavy Melt. Steel	14.50
No. 1 Busheling	15.50
No. 1, No. 2 Bundles	13.50
No. 3 Bundles	9.00
Machine Turnings	6.50
Billet, Forge Crops	15.50
Bar Crops, Plate	15.50
Cast Steel	15.50
Cut Structural, Plate, 1", under	18.00
Alloy-free Turnings	7.50
Tin Can Bundles	14.50
No. 2 Steel Wheels	16.00
Iron, Steel Axles	23.00
No. 2 Cast Steel	15.00
Uncut Frogs, Switches	16.00
Scrap Rails	16.00
Locomotive Tires	16.00

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.40c, corroding, 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low-grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.50c to 8.75c, Grade 4 (85-90%) 7.50c to 8.00c; any other ingot containing over 1% iron, except PM 754 and hardness, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.), 20.50c lb., add 1c for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Prices for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American, bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224-lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: OPA ceiling prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz., $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193. Open market, spot, New York, nominal for 50 to 100 flasks; $158 to $163 in smaller quantities.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb. for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $7.50 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 44.75c per ounce.

Platinum: $35 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2% 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¾c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze 90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil, 5%	9.250	9.000	4.625
Phos. br., A, B, 5%	11.000	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	3.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb., 11, 14, etc., 3 to 3.50c lb. All other high-grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less than segregated.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings 7.25c, old zinc 5.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 166

With some shifting in demand the overall situation in sheet and strip markets is little changed. Rated orders are tapering somewhat and a cautious attitude is maintained. Unrated orders continue to come in despite the fact most producers believe from their commitments they will be unable to roll much of this tonnage this year, especially in most wanted sizes and gages. Carryover into third quarter is heavy.

New York — While pressure for sheets for nearby delivery continues, there is a tapering in rated orders, which is reflected in future deliveries. Consumers with war work are specifying more cautiously and with no more CMP allotments available after the turn of the year, some buyers have canceled tonnage that they had previously placed.

However, deliveries are well extended and in some cases the trend is decidedly mixed. For instance, one producer is now quoting April delivery on plain hot-rolled and hot-rolled pickled sheets whereas only a week ago this interest was quoting February. At the same time, his schedule on cold-rolled sheets has eased to the extent that he can now take on some tonnage for October as compared with late November and December recently. In this case at least the situation is ascribed to larger mill quotas on cold-rolled at the expense of hot-rolled.

Certain other producers show relatively little change, with hot-rolled pickled and cold-rolled sheet deliveries averaging late this year and the early part of 1946. Deliveries on galvanized sheets fall largely in next year, being quoted February and beyond in various instances. Stainless steel is generally available for September shipment.

While rated tonnage is somewhat less active, the volume of unrated orders is well sustained, notwithstanding the fact that there appears to be little likelihood that any of this business will be rolled before late in the year, except possibly in certain heavier gages. Some producers, in fact, believe they will be unable to roll any "free" tonnage in the popular sizes this year.

Cincinnati — Sheet mills in this district have a heavy carryover into third quarter, a result of overloads in rated tonnage not balanced by cancellations. Recent labor difficulties which caused a shutdown at one mill, and cut rolling at another have been removed. However, production lost has caused further delay in deliveries. The supply situation is tight, without heavier cutbacks, for the entire quarter, darkening the outlook for any considerable volume for civilian needs.

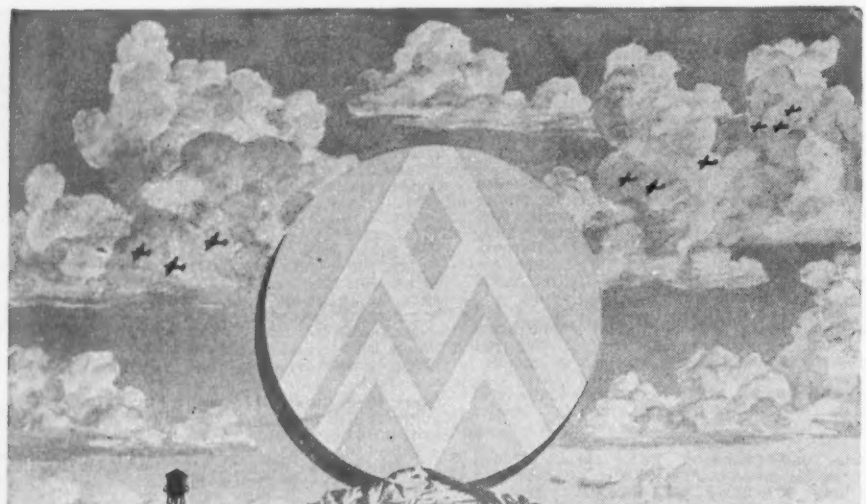
St. Louis — Heavy demand for sheets shows no decline, especially for hot-rolled. Claimant agencies are pressing for July and August delivery on some orders but schedules are extended to January and later. Railroad car builders seek much tonnage for important programs. Labor is little improved, except that such as is available is of better efficiency. Cold-rolled sheet deliveries are in March, tin plate in October and later, alloy sheets in January and galvanized in December. Eight of Granite City Steel Co.'s 13 open hearths are idle for repairs or to allow working off surplus of ingots and all will resume soon after July 1.

Boston—Placing of unrated orders for sheets and strip gradually contracts but cancellation from cutbacks appear in scattered lots. Although deliveries have ceased to become more extended, openings have not developed in schedules to warrant optimism as to volume of unrated tonnage for third quarter. Heavier gages of hot-rolled carbon sheets may be

Shortage of Sheet Steel Hinders Reconversion Plans

John D. Small, chief of staff, War Production Board, last week predicted no improvement in the tight sheet steel situation until late in third quarter. Failure of cutbacks to show up on steel mill order boards has so alarmed WPB that J. A. Krug, chairman, has sent letters to 800 war plants asking that they cancel their priority orders for metal when their war contracts are reduced.

This shortage of sheet steel threatens reconversion of the automotive and other industries which received their "go-ahead" signal effective July 1. Theoretically, every ton of sheet steel in the estimated supply for the third quarter is spoken for by military and other priority users, leaving none for automobile and similar civilian goods makers.



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Precision manufactured structural assemblies and steel forgings for aircraft are being produced in the heart of one of the world's most famous summer playground areas—the Pikes Peak region of Colorado.

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Today, our efforts are devoted to the production of war goods. Tomorrow, our ability, experience and ingenuity will be devoted to civilian production.

Meanwhile, if it is your plan to visit the cool and delightful Pikes Peak region this summer, let us invite you also to visit our plant, and inspect for yourself the engineering and manufacturing facilities we offer.

BUY UNITED STATES WAR BONDS AND STAMPS

★ **AIRCRAFT MECHANICS** INC.

COLORADO SPRINGS, COLORADO

DESIGNERS • • • ENGINEERS • • • MANUFACTURERS

a limited exception with a few mills.

Cleveland—No easing is apparent in the market for sheets and strip, expected cancellations failing to come out, though it seems probable July and August will see further reductions. Mills backlogs are heavy and carryover of unfilled orders scheduled for second quarter is unusually large. Delivery promises on current sheet orders are in January and February, although an occasional small lot can be handled earlier, depending on quality and gage. These, however, are the exception. A large local interest would like to have a million tons of all products removed from its books and hopes cancellations later this year may wipe off a portion of this.

Boston—Priorities assistance for acquistion of steel for third quarter by issuance of allotments for household appliances, domestic mechanical refrigerators and washing machines, permitting use of AA-3 preference rating for other materials and components has been granted few in this area to date. General Electric Co., Bridgeport, Conn., has been assigned priorities assistance for 18,430 washing machines and Landers, Frary & Clark, New Britain, Conn., 5600. Firm allotments and preference ratings third quarter, will be given manufacturers of table knives, forks and spoons; total of 46 million pieces is near 15 per cent more than for the first two quarters. Increase is largely for civilian use. There is still doubt producers will meet the increase by getting steel or components, with manpower and continuation of war contracts at some plants a factor. Stainless steel supply for civilian flatware has improved slightly and copper base alloys, nickel excepted, are now ample. Anodes and salts for plating are tight; nickel plating of civilian flatware, beyond the total given priorities assistance, will continue restricted.

Chicago — Only reduced demand or substantial cancellations can improve the sheet outlook. Output of all grades is up to production directive, but cancellations so far are almost negligible and new rated orders are heavy. Prospects for sheets on an unrated basis, such as for automobiles, are definitely not in picture as it stands at the moment, furthermore, there is conjecture as to what tonnages can be made available for washing machines, refrigerators and electric stoves, which have priority assistance. It is reported that the War Department Quartermaster office, Jeffersonville, Ind., will inquire shortly for 31,800 tons of drum sheets for overseas shipment.

Pittsburgh — New buying on military programs continues heavy. Container demand is steady and there are some indications that the present program, already huge, will be increased. Manufacturers of steel containers have been asked to step up production to meet the tremendous demand for supplies in the Pacific area. Meanwhile, civilian tonnages even larger than those required in the military program have appeared and are a chance to find some gap in the production schedule. It is pretty obvious now that the only way WPB will be able to come through on its promise of adequate steel for the manufacture of refrigerators, automobiles and some other products as yet unnamed officially will be to return to the directive system and simply shove this tonnage on the mills before scheduled military items. Whether this will actually be done remains to be seen. However, most sources here expect that it will be, and in fact believe the action will be forthcoming soon.

Steel Bars . . .

Bar Prices, Page 166

Reductions in war requirements have eased the bar situation somewhat but most producers see little likelihood of being able to handle any unrated tonnage in third quarter. Considerable new priority tonnage is coming out constantly and cutbacks already announced take effect gradually, covering several months. On hot-top quality carbon bars most producers are booked well into fourth quarter on most sizes. Alloy bars are much easier and some business may be taken for July and August shipment.

New York—Notwithstanding the recent announcement by the army of a 50 per cent overall reduction in artillery shell output, most carbon bar sellers here believe they will have little capacity available in third quarter for unrated tonnage. In the first place, the cutbacks are to take effect gradually, extending through September; and, in the second place, a fair amount of new priority tonnage is constantly being booked.

Moreover, producers of carbon bars are booked well into fourth quarter on most sizes and on hot-top quality steel, well into first quarter of next year, and actually on certain of the very largest rounds, into second quarter in some cases. As a matter of fact, it is believed these cutbacks will affect the future positions far more than those nearby.

As the situation now appears, some unrated capacity for small carbon sizes

may be available in the third quarter; also for alloy bars in a fairly wide range of sizes.

Cleveland—Bars show slightly better position, though most orders on books now are for war purposes and cancellations have been much less than had been expected. Deliveries on current orders can be promised for October and later on large diameters in carbon grades. Some carbon hot-top orders can be promised about the same delivery. Alloy bars, in common with other alloy products, are easier and promises can be made for third quarter, depending on size and type of alloy. It is possible some business can be taken for July or August shipment in alloys.

St. Louis—Bar producers here expect that cutbacks in the shell and bomb programs will become heavier and perhaps allow shipment for civilian products to be made by August or September. One local shell plant has received a 27 per cent reduction and Army ordnance office warns of a drastic further cut soon. Civilian orders are increasing, especially for road and building construction. Pressure on all rated orders is easing except for the moderate tonnage in orders for the new type incendiary bomb. All other shell and bomb orders have been reduced.

Boston—Slight improvement in hot carbon bar delivery schedules involve more sizes and supplies of semifinished are in larger volume but any substantial volume of unvalidated third quarter deliveries still depends mainly on nearby cutbacks. Cold-finished bar schedules are tighter than hot-rolled in both carbon and alloys. The aggregate decline in bar requirements growing out of cutbacks is substantial, including a new 75mm shell contract. Several forge shops producing automobile parts are pressing for third quarter delivery but for the most part users in civilian products are not seeking to place large unrated orders. Textile mill machinery builders are covered into fourth quarter and bolt and nut shops have improved deliveries further.

In distribution of contracts for navy turnbuckles, two Maine shops share, largest going to Maine Steel Co., South Portland, $33,405. Thomas Laughlin Co., Portland, was also awarded a contract.

Chicago — Quality bars continue in tight demand, but regular carbon and alloy grades are in comfortable position. The entire bar situation is expected to ease somewhat in the next three months, by virtue of further cuts in artillery shell contracts announced from St. Louis ten days ago. Affected in the cutbacks are 17 shellmakers in the Chicago Ordnance District. Ordnance officials here state that $2,800,000 per month is being cut from production schedules by September. While this represents a reduction of 41 per cent in shell output of the companies affected, it is only around 6 per cent of the district's ammunition production.

Steel Plates . . .

Plate Prices, Page 167

Some platemakers are sold ahead for two months on rated tonnage and even with CMP open ended after July 1 they expect little open capacity for unrated sheared plate tonnage during third quarter. Others believe schedules will permit some unrated plates to be rolled for August, both sheared and universal, with possibly some of the latter for July. Three refrigerated cargo vessels have been placed, requiring about 11,000 tons, mainly plates.

New York—While production directives were lifted July 1, as there was not enough priority tonnage in sight to fill capacity, plates nevertheless will continue under CMP control. CMP tickets will be issued where tonnage is desired for war or essential civilian work. Some producers are already filled up for the first two months on rated tonnage and they anticipate that even though the open ending of CMP was inaugurated July 1 with plates primarily in mind, they may not have much capacity for unrated sheared tonnage before the end of the quarter. However, on the other hand, some mills are confident they will be able to work in some of this business for August, and as for universal plates they are more than confident that they will have capacity for unrated work in that month, and possibly even some in July.

Overall plate demand here is rather spotty, although ship repairs, as well as ship construction, are still consuming substantial tonnage.

St. Louis—Plate demand continues its decline, production locally being confined to ship repair. Most plate capacity has been shifted to sheets. Production now is about 4000 tons per month, in contrast to 20,000 tons at the year's peak.

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Co., on a fixed-price basis, is low, $4,500,000 each for construction of three refrigerated cargo vessels for United Fruit Co., requiring about about 11,000 tons, mostly plates. Eight yards bid, including Bath Iron Works, Bath, Me., $5,120,000; Ingalls Shipbuilding Co., $4,740,000; Sun Shipbuilding Co., Philadelphia, $4,673,000; Bethlehem Shipbuilding Co., Sparrows Point, Md., $5,500,000; Federal Shipbuilding Co., Kearny, N. J., $5,615,000; Gulf Shipbuilding Co., Mobile, Ala., $5,171,250; J. A. Jones Construction Co., Brunswick, Ga., $4,575,926, the latter subject to additional 3½ per cent surcharge on government owned facilities.

Plate demand continues to ease. Inquiry from fabricators and warehouses falls far short of former shipyard requirements. Except for lower needs for Navy ships, repairs and conversions, shipbuilding inquiry is meager, while industrial orders are fairly well maintained. Carbuilding tonnage is substantial but railroads are not buying heavily. Sheared plates are available for third quarter delivery against unrated orders, but such orders are not impressive.

Philadelphia — Unrated plate orders to date have not been heavy, due in part to the fact that many in the heavy industries are on a rated basis and also to the fact that there is no particular concern as to the availability of plates, now that emergency requirements are decidedly on the decline. Another factor is that while the plate situation is becoming increasingly easy it is not possible yet in many cases for producers to promise definite shipments on unrated tonnage. However unrated business should become more pronounced as the new quarter advances. Approximately 12,000 tons of hull steel, mainly plates, will be required for three refrigerated ships for the United Fruit Co.

The Navy probably will be the largest consumer of plates in third quarter, although the Army may be almost as large a consumer for numerous diversified requirements. Plate sellers look for some tonnage for export in third quarter but are not sure as to the quantity. There has been no recent important buying since distribution of 29,000 tons of plates for shipment under lend-lease to France. However, there is talk of further tonnage for France, Sweden, Holland and French North Africa.

Pittsburgh — Open ending of CMP has not resulted in heavy unrated plate tonnage. In fact the total orders booked in recent weeks are small compared to the tonnage average per week over the past two years. All plate mills which could be converted to sheet production have been, and despite the fact that there has been a fair increase in building construction in recent weeks, most of the new contracts are for reinforced concrete and not structural steel. It is reported that the primary shipbuilder on the merchant program has less than 40 ships to go before completing the contract and much of the river boat construction activity in this area is using excess plate from previous shipbuilding programs.

Chicago — While most platemakers experience lessened demand and are reducing rolling schedules accordingly, a few maintain heavy rollings by virtue of substantial commitments for bomb steel. Mills not holding much bomb steel business will be in position to exercise some latitude in orders after July 1 when plate production directives are dropped. Present plans are that they will establish their own CMP acceptance limits with WPB approval and any excess steel not required to meet production directives on other products can be used to fill unvalidated plate orders.

Tubular Goods . . .

Tubular Goods Prices, Page 167

Seattle—Cast iron pipe dealers find continued difficulty in obtaining deliveries and some projects are being postponed because of this condition. Seattle has 400 tons pending for three improvements. Bids have been opened at Aberdeen, Wash., for 150 tons of 6 and 8-inch and Kelso, Wash., has received bids for about 200 tons.

Philadelphia — A substantial tonnage of four and six-inch steel pipe has been placed by the Navy among several producers, for shipment to the Far East. Philadelphia water department will close bids July 9 on 800 tons of 48-inch steel pipe. This is in addition to 1500 tons of large diameter steel pipe recently noted as pending.

Wire . . .

Wire Prices, Page 167

Pittsburgh — Slight reduction in the wire rope program, involving approxi-

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mately 10 per cent of its total, or about 2500 tons per month, plus a heavy cut in fine wire buying for July and later, has resulted in considerable easing in the delivery problem on this item. With this change practically all wire is now in fairly good shape for July or later. Nail situation is still acute with tremendous volume of cement-coated box nails still clogging the enameling machines and preventing production of other types. Effective July 1, fence, netting, barbed wire, and mesh go off directive and out from under CMP program, which will probably result in substantial increase in the production of fence. Barbed wire output is expected to remain virtually unchanged, while a small tonnage of lawn fence will be produced, the first since 1942. Increasing volume of orders for bale ties seems to indicate a new tightness in that category after what promised to be a substantial easing.

Chicago — Wire consumers appear disappointed that they will not get more tonnage after July 1. This applies particularly to lawn fence and corn cribs. Fence and associated products are expected to continue in brisk demand despite crop results. Supply of steel posts is far short of requirements. Heavy demand is developing for spring wire in finer sizes, now released by WPB for production, this coming mainly from manufacturers of innerspring mattresses. However, this business is unrated and manufacturers cannot touch it. Facilities on which it is made are heavily booked with rated orders.

Boston—Total tonnage involved in wire product cancellations covers a fairly wide range of sizes and not enough in any one product to indicate substantial openings in nearby schedules for unrated tonnage, although here and there a few exceptions are apparent. While pressure for rope and tire bead wire has eased, demand is heavy and there are few openings in these. On the whole, semifinished supply has improved but on numerous specifications, notably rods for fine wire specialties, supply is still tight, with deliveries well into fourth quarter. Considerable music spring wire is being taken up in the East from surplus excess stocks by furniture and bed spring manufacturers.

Tin Plate . . .

Tin Plate Prices, Page 167

Chicago — Under present production directives, November is the first month with openings for tin plate. The situation could change only with cancellations, which appear unlikely. Platemakers continue hard pressed for box cars to maintain shipments under demand for rail equipment to handle the midwestern grain crop.

Rails, Cars . . .

Track Material Prices, Page 167

New York — Included in scattered domestic orders are 59 stainless steel coaches, of which 39 are for the Atlantic Coast Line and 20 for the Florida East Coast Railways. These cars have been placed with the Edward G. Budd Mfg. Co., Philadelphia, and are in addition to 48 recently booked by that company for the Seaboard Air Line. The Western Maryland is reported in the market for a number of cement cars. Also, to come into the market recently are 25 fifty-ton box cars for the Rapid City,

Black Hills & Western, which is also inquiring for one 800-horsepower and one 1000-horsepower diesel-electric freight engine and one rail motor car.

The Delaware & Hudson has closed on five 4-6-6-4 steam locomotives to the American Locomotive Co., New York, while the Virginian is inquiring for five 2-8-4 type freight engines, with tenders. The Erie has asked bids on 1400 cars, including 700 box cars, 600 gondolas and 100 covered hoppers.

Structural Shapes . . .

Structural Shape Prices, Page 167

Chicago—The past two weeks have seen appreciable increase in inquiry for fabricated structural steel. A substantial part comes from automobile companies for new facilities. Some extensions to power companies also are being made, this work rating WPB approval. Some inquiries, however, come from companies planning postwar expansion, but prospects for these projects are not bright until the mill situation improves. Structurals are definitely tight.

New York—With prospects slim for unrated shape tonnage being available in third quarter, structural inquiry is being confined mainly to projects carrying priorities, and at present there are relatively few new inquiries of even this type, although there is a fair accumulation of tonnage which should be placed shortly. One of the latest projects involves 200 tons for two service training buildings at West Point, N. Y.

All leading shape producers are now booked well into September on rated work, with one large interest quoting November on standard shapes, although still able to take some wide flange business for September rolling.

Boston—While structural inquiry has improved slightly the slack from shipbuilding has not been filled. The limited amount of reconversion construction in this area indicates no heavy demand for shapes for industrial building. Bridge inquiry is beginning to appear as restrictions ease but hardly a start has been made on planned postwar programs. Most structural fabricating shops now are operating on curtailed schedules and are in need of tonnage. Plain material deliveries generally are in September.

Philadelphia — Further substantial buying of shapes for lend-lease shipment has tightened schedules of at least one producer, who now is into November on standard sections. An outstanding domestic structural award involved 7000 tons for an assembly plant for General Motors Corp., at Wilmington, Del., placed with Bethlehem Steel Co., Bethlehem, Pa. Bids were closed June 27 by United Engineering Co., Philadelphia, on 1000 tons for a generating station at Devon, Conn., for the Connecticut Light & Power Co. Bids on 2000 tons for a Navy warehouse at Mechanicsburg, Pa., have been postponed to July 7. Other pending projects include 1100 tons for a duPont plant at Clinton, Iowa, and 160 tons for a warehouse for Carpenter Steel Co., Reading, Pa.

Pig Iron . . .

Pig Iron Prices, Page 169

Foundry vacations are fairly general this week, interrupting shipments of pig iron, but melters want as much for third quarter as in second. Producers are

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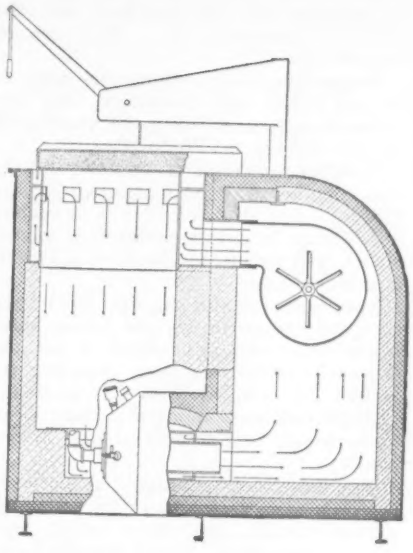

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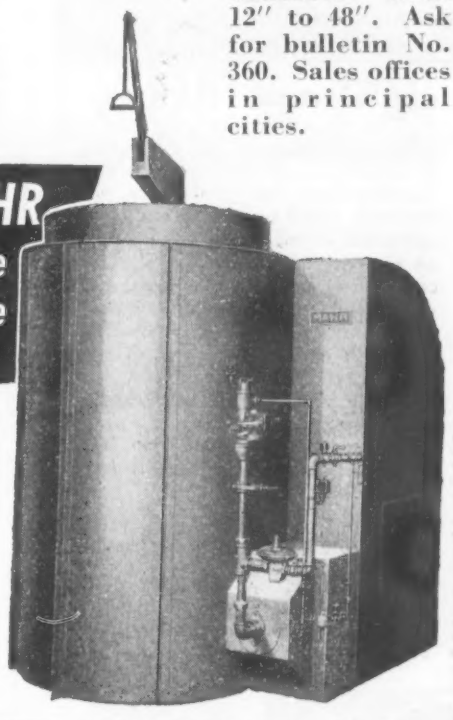

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shipping their entire make and no stocks are being accumulated. The 30-day restriction on inventory remains in effect, on advice of the industry committee.

New York — With various foundries closed for the entire week, pig iron shipments in this district have reached the lowest point this year. However, they are expected to resume sharply in the following week, with the melt at, if not near recent levels. Much depends upon the temperature of the weather and the ability of operators to keep their men on the job.

Suspension of operations this week is for vacations and inventory, the occasion being taken because of the Fourth of July holiday on Wednesday.

With continuation of controls on pig iron unanimously recommended by the Pig Iron Industry Advisory Committee, the 30-day inventory restriction, among others, will remain in effect, as indicated in a recent issue.

Swedish orders for pig iron have been accepted on an as, if and when basis. While the tonnage involved is not announced Sweden has been inquiring for 50,000 to 100,000 tons of bessemer. That no definite commitments have been made is due to tightness of iron in this country.

Buffalo—Despite substantial cutbacks in armor castings for tanks pig iron melt remains steady, as railroad orders have taken up the slack. Gould Coupler Corp. reports among large orders some castings for locomotives for France and Russia. Some railroad orders received here are subcontracted by a leading locomotive builder. These orders illustrate the ease with which foundries can convert to civilian goods manufacture. Labor shortage continues to hamper production. Sellers report bookings for third quarter at least equal to second quarter.

Cincinnati—A holiday in midweek has brought decision by many foundrymen to announce vacations for the first week in July, despite continued pressure for castings. Pig iron deliveries are therefore interrupted but all interests want tonnage for the quarter unaffected. Shipments are steadier, indicating some easing in supply although furnaces annnounce there is no surplus iron and restrict, for the most part, sales to old customers.

Pittsburgh — While the situation is still tight there is a definite improvement, based probably on the fact that steelmakers have placed in operation additional furnaces for production of their needs, thus taking some pressure off the merchant market. In general, the hand-to-mouth situation continues. Foundry pig iron markets are still tight, with supplies below the safety level at some plants. Some car difficulties have held up shipments at various points, and the promise of a more serious shipping situation later in the summer has added somewhat to the tension of the current market.

Philadelphia — Pig iron shipments and consumption in this district will be off during the first week of July because of suspensions at various foundries for vacations and inventory taking. Outlook for the month, however, is promising, with producers possibly having difficulty meeting commitments.

Boston—With only slight change in melt indicated for third quarter most consumers have covered through that period, although some continue to buy on a monthly basis. Most iron continues to come into this area from outside furnaces, mainly through Buffalo, the ratio being the heaviest in recent years. Sellers who have been inactive in this territory during the war years show more interest in prospective tonnage. Removal of inventory restrictions would increase buying substantially on the part of some consumers who normally stock much more heavily.

Chicago — Pig iron supply has been growing tighter, due both to continued strong demand and a deteriorating blast furnace situation. It is estimated that close to 50 per cent of foundries in this area will close during the week of July 2 to give workers vacations. This will tend to ease the strain on pig iron, since holdups are being issued against incoming shipments. Suppliers will thus have a short breathing spell to readjust shipping schedules. With the announced blowing out of Indiana Harbor No. 5 blast furnace of Inland Steel Co. at the end of June, operating stacks will be reduced to 37 out of a total of 41.

Scrap . . .

Scrap Prices, Page 170

All signs of weakness seem to have disappeared from the scrap market, except in the case of borings and turnings, and these have strengthened recently on continued demand and smaller supply. Steelmaking grades are at ceilings and concessions prevailing in some eastern areas have disappeared. Large melters in most districts are buying after a lull and considerable tonnage has been contracted. Supply seems sufficient in spite of labor shortage in yards and the seasonal lull usual at midsummer.

Cleveland—Strength is increasing in the steel and iron scrap market and all interests in this district are buying freely at ceilings after a dull period when many important consumers were out of the market. Steelmaking grades are in strong demand and borings and turnings have been advanced 50 cents per ton as supply has become less and demand continues. Supply is fairly good, though yards are hampered by lack of labor in collection and preparation. Consumers are building stocks after a period of reduction. vanized most difficult to obtain.

New York — Local brokers' buying prices on machine turnings and mixed borings and turnings have been advanced to a flat $8.50 per ton, and practically all other grades are strong and unchanged at ceiling levels. There has been little new consumer buying of melting steel, but the movement continues substantial on orders recently placed for Bethlehem, Pa., and Sparrows Point, Md., and also against older orders for the Pittsburgh district. Borings and turnings are also moving to Bethlehem and Sparrows Point against orders placed a relatively short while ago.

Buffalo — Stronger tendencies prevail in the steel and iron scrap market, with sales of 20,000 tons of steelmaking grades at ceilings, less commission. Turnings have advanced $1 per ton. A leading mill interest which earlier bought 17,000 tons followed by purchase of 15,000 tons on which freight rate tax was paid. On the former purchase the dealer paid this tax. Another melter bought 5000 tons on the same basis. Omission of the brokerage fee was not a factor with most sellers because as yard operators they are not entitled to a

commission. Yard receipts have increased under better weather conditions.

Cincinnati — The iron and steel scrap market is steady, and prices hold, despite lack of volume buying. Dealers and brokers, although showing confidence there will be no break, are following conservative policies of melters and avoiding overbalanced inventories. Major consumers tend to reduce stocks but may re-enter the market after the holiday. Foundry shutdowns early in July for vacations tend to curtail interest somewhat in some grades.

St. Louis — Brisk demand and smaller shipments due to labor shortage promise another shortage. Shipments are off 50 per cent and demand continues heavy in spite of shortened consumption. The usual summer drop in deliveries is expected to cut heavily into mill reserves, now estimated at about six weeks. Most mills and foundries are still out of the market. Considerable scrap is going to the strong Chicago market. Heaviest demand is for heavy melting steel.

Los Angeles — Scrap supply in this area is better than in many other districts. Stock piles are slowly diminishing but prices have not yet reached ceilings. Mills are reported buying lightly. War surplus stocks are coming onto the market in some quantity with only a small part reusable. Dealers are wary of accumulating tonnage, except in cast grades, which are scarce. Shipbuilding curtailment has brought stocks of heavy melting steel to a new wartime low.

Boston—Additional strength is maintaining most steelmaking grades at ceilings, with strictly carbon turnings firmer. However, alloy turnings are still weak and accumulations of carbon turnings about which any question of analysis exists are slow to move. Mills in this area are buying heavy melting steel but holding to specifications rigidly. This tends to limit volume in bundles but demand for the latter from Pennsylvania is heavier. Slight, if any, improvement in supply of cast scrap is apparent.

Philadelphia — Strength in scrap is reflected by a further increase in machine shop turnings and mixed borings and turnings to a spread of $12 to $12.25. delivered. Meanwhile, heavy turnings have moved to the ceiling of $18.25. production and labor shortage in scrap continue at ceiling. Strength in heavy melting steel is ascribed to short pig iron production and labor shortage in scrap yards. There is a fairly good accumulation of unprepared scrap but not enough men to process it for consumption.

Pittsburgh — All local consumers are in the market and volume of scrap moving is reported heavy. All reported sales are at ceiling, most of them plus springboard. The soft situation in machine shop turnings has been eliminated to a considerable extent and sales of this item at ceiling levels have been reported but not confirmed. Short shoveling turnings have reached ceiling and in fact are in short supply at the moment. The reason for this situation is the cutback in shell production which has cut into the heavy volume production of all grades of turnings.

Chicago — With all primary grades of scrap already at ceiling, turnings and borings are headed for that level. Mixed borings and short turnings have brought ceiling of $13.75, and a few days ago machine shop turnings were sold at $13, only 75 cents below maximum. Short shoveling turnings now stand at $14 to

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$14.50, and cast iron borings at $13.25 to $13.75, a gain of $1.25. No. 3 galvanized bundles moved to ceiling of $16.75 a week ago when bundled machine top turnings rose to a maximum of $18.75. Strength of the market is believed to be genuine as demand is substantial, better grades are not too plentiful and a deteriorating blast furnace situation requires steel mills to place heavier dependence on scrap.

Warehouse . . .

Warehouse Prices, Page 168

Cincinnati—Sales of warehouse steel are sustained at a level which is placing a strain on preparation and deliveries with the limited manpower available. Cutbacks have been moderate and balanced by other needs, some seasonal. The requirements of coal mining interests tend heavier than normal.

Refractories . . .

Refractories Prices, Page 169

An increase to 6 per cent from the 3 per cent previously granted, over the March, 1942, ceiling prices of fire clay and silica refractory brick produced east of the Mississippi river and in Missouri has been granted by Office of Price Administration, effective June 25. As of Jan. 8, 1945, OPA allowed an increase of 3 per cent over the March, 1942 ceiling but since that time production costs have risen and the second increase was allowed to restore earnings to the 1936-39 level. Jobbers and dealers purchasing these products may add to their ceiling prices the dollar-and-cent amount of increase resulting to them from the adjusted producer's prices.

Steel in Europe . . .

London — (*By Radio*) — Export conditions for steel and iron products from Great Britain are greatly relaxed. Good inquiry is entertained for structural sections and rails. Locomotive and freight car builders are buying sheets and heavy plates. First cargo of Swedish ore in several years has been received.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

7000 tons, Buick-Oldsmobile-Pontiac assembly building, Wilmington, Del., for General Motors Corp., to Bethlehem Steel Co., Bethlehem, Pa.; bids June 1.

3000 tons, transit sheds, Stockton, Calif., for U. S. Navy, to Virginia Bridge Co., Roanoke, Va.

2000 tons, addition, Harrison Radiator Division General Motors Corp., Lockport, N. Y., to Ingalls Iron Co., Verona, Pa.

750 tons, new plant, Kansas City, Mo., for Corn Products Refining Co., to Vierling Steel Works, Chicago; bids May 19.

STRUCTURAL STEEL PENDING

1500 tons, foundry building, Dubuque, Iowa, for Deere & Co.; bids June 20.

2080 tons, storage warehouse, East Chicago, Ind., for RFC; Bethlehem Steel Co., Bethlehem, Pa., low; bids June 18.

1100 tons, extension to cellophane plant, Clinton, Iowa, for E. I. du Pont de Nemours & Co. Inc.; bids June 20.

400 tons, plant extension, Rockford, Ill., for Central Illinois Electric & Gas Co.; Stone & Webster Corp., Boston, engineers; bids June 25.

380 tons, terminal building, Chicago Municipal Airport, for department of public works; bids June 29.

320 tons, factory building, Austin-Western Co., Aurora, Ill.; bids June 20.

300 tons, factory building, Storkline Furniture Corp., Chicago.

250 tons, TPG span, bridge Z-1510, Yorkshire, Iowa, for Chicago, Milwaukee, St. Paul & Pacific railroad; bids June 25.

200 tons, factory building, Green Bay Box Co., Green Bay, Wis.

200 tons, two service training buildings, West Point, N. Y.; bids closed June 27.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1600 tons, power plant expansion, Havana, Ill., for Illinois-Iowa Power Co., to Laclede Steel Co., St. Louis; George A. Fuller Co., Chicago, contractor.

300 tons, administration building, Army air base, Camp Springs, Md., to Virginia Steel Co., Richmond, Va., through Harwood-Nebel Construction Co.

250 tons, Scranton Electric Co., subsidiary of American Gas & Electric Co., Scranton, Pa., to Truscon Steel Co., Youngstown.

230 tons, welded wire fabric, highway construction, Peoria and Stark counties, Illinois, for state highway commission, to Ceco Steel Products Corp., Chicago, through Consumers Co., Chicago; Graham Paving & Construction Co., Chicago, contractor; bids June 1.

REINFORCING BARS PENDING

740 tons, veterans hospital, Reno, Nev., for U. S. Veterans Administration; bids June 26.

152 tons, invitation No. 34438-A, Bureau of Reclamation, Hay Springs, Neb.

142 tons, addition, Harrison Radiator Division General Motors Corp., Lockport, N. Y.

130 tons, virus infectious disease laboratory, Bethesda, Md.

120 tons, additional training buildings, West Point, N. Y.

PIPE . . .

CAST IRON PIPE PENDING

1320 tons, 8, 12 and 16-inch, also 58 tons water pipe specials, Washington; bids, bids July 9 to district commissioners.

RAILS, CARS . . .

RAILROAD CARS PLACED

Atlantic Coast Line, 39 stainless steel coaches, to Edward G. Budd Mfg. Co., Philadelphia.

Florida East Coast Railway, 20 stainless steel coaches, to Edward G. Budd Mfg. Co., Philadelphia.

RAILROAD CARS PENDING

Erie, 1400 all-steel cars; bids asked; include 700 fifty-ton box cars, 600 seventy-ton drop-end gondolas, 100 seventy-ton covered hoppers, for delivery in first and second quarters, 1946.

Rapid City, Black Hills & Western, 25 fifty-ton box cars; bids asked.

LOCOMOTIVES PLACED

Delaware & Hudson, five 4-6-6-4 freight engines, to American Locomotive Co., New York.

LOCOMOTIVES PENDING

The Virginian, five 2-8-4 type freight engines; bids asked.

Rapid City, Black Hills & Western, two diesel-electric freight locomotives, of 800 and 1000 horsepower; also one 400-horsepower diesel-electric rail motor car.

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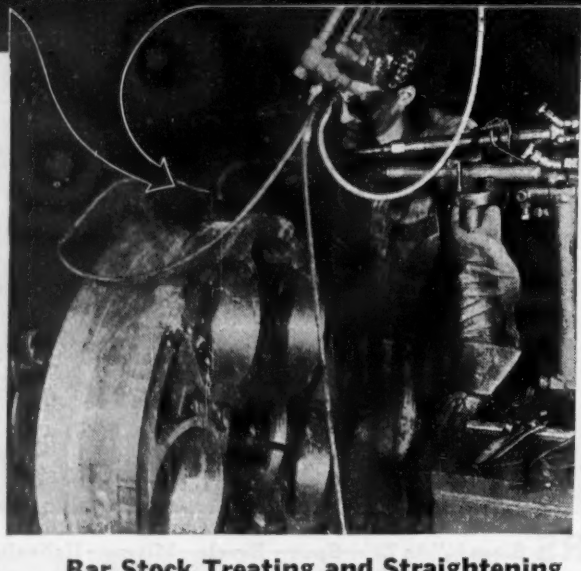

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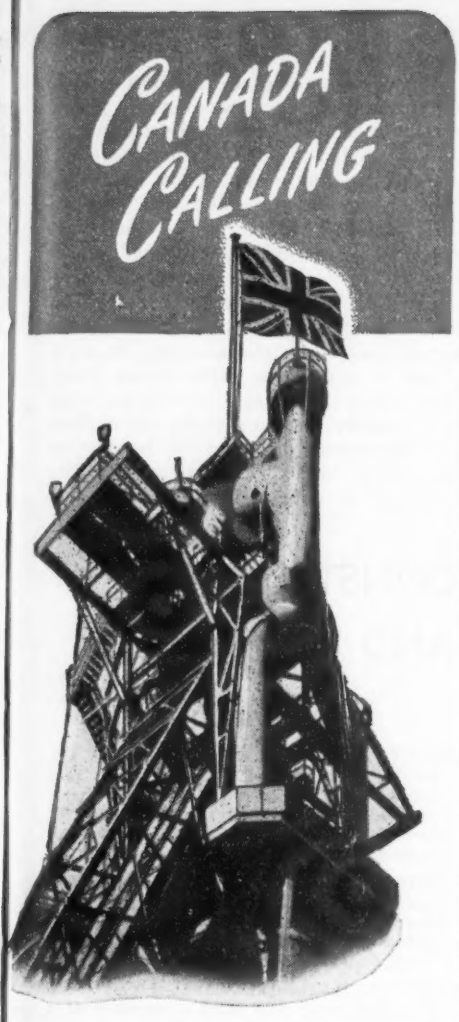

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Will consider production on a royalty basis or straight purchase of ideas showing evidence of filling market needs through large quantity production.

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War Production Hampered By Strikes at Many Points

(*Concluded from Page* 61)

one of the administration's projected methods for dealing with reconversion and postwar wage problems is upward revision to 50 cents of the 40-cent-hourly wage rate prescribed by the Fair Labor Standards Act. The Davis proposal, according to Thomas I. Emerson, general counsel for OES, in addition to the 25 per cent increase in the basic minimum wage, would allow further upward increases to 65 cents in minimums for specific substandard industries.

Spot unemployment is reported at various points. Over the nation, however, shortages of labor continues, especially on the Pacific Coast where thousands of skilled workmen are needed for naval repair work. At several production centers some easing of manpower controls has been effected by the War Manpower Commission as war production needs eased off. Not much labor has been affected as yet by cutbacks and the labor supply situation at many points continues tight. In the greater Cleveland area, for example, there are openings for 17,000 workers, including 5000 for high war priority jobs. Because of this the joint labor-management committee in the district has decided against any relaxing of WMC controls for the time being. On the other hand, definite easing in the situation is reported at Detroit where Edward L. Cushman, Michigan director of the WMC, last week predicted there would be "at least 80,000" unemployed workers in the Detroit area by Sept. 1. He said that as of June 1 there were 25,000 women and 5000 men unemployed in the area. Victor G. Reuther, CIO official, predicts that unemployment in the Detroit area by Sept. 1 will total 140,000.

Unemployment throughout the nation at present is not serious. Total unemployment was 730,000 in May compared with 770,000 in April and 880,000 in May a year ago, according to the Census Bureau. Normal unemployment in prosperous times is placed at about 2,000,000. The number of production workers has dropped to 12,442,000 in May from 14,338,000 in January, 1944.

Particularly disturbing in the strike situation is the fact that union officials have not been able to exert much influence in keeping their followers on the job. Right now they are particularly apprehensive as to the effect of the strikes on public sentiment toward the whole labor movement, and they see the recently introduced Federal Industrial Relations Bill, introduced by Senators Burton, Ball and Hatch, and which has been denounced by such labor leaders as William Green, Philip Murray and John L. Lewis, furthered by the current wave of labor trouble. Last week, Richard T. Frankensteen, vice president, United Automobile Workers, CIO, branded as "tragic folly" the series of labor disputes which have made thousands idle in the Detroit area.

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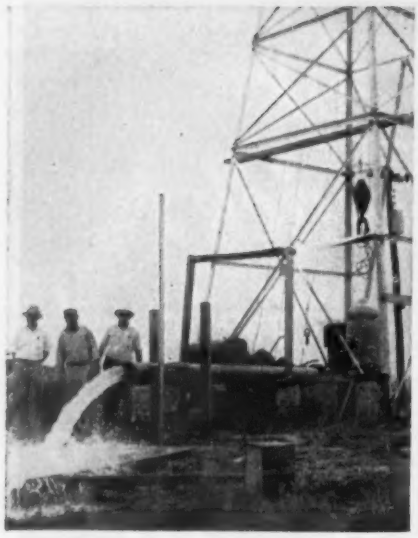

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LAYNE

WELL WATER SYSTEMS
VERTICAL TURBINE PUMPS

Surplus Tool Stock Urged As Insurance for Future

(*Concluded from Page* 79)

fered to industry and other such groups as could best put them to work in the interest of full employment and maximum production of peacetime goods. Repeated warnings were issued against scrapping valuable machinery.

Repeatedly it was emphasized, also, that foreign markets provide no major solution, asserted Mr. Bryant. England has expanded its machine tool producing facilities also, and with its own surplus problem is in a favorable position to sell to its own colonial markets and to the continent. Russia, largest potential foreign market, will prefer to buy other nations' products or manufacture its own, rather than accept our surplus used machinery . . . "they want only the finest, new American machine tools, especially of the high production variety." China, South America and other future markets can absorb only a moderate number of simple machines until they develop further industrially.

"The first concern of us all as United States citizens is that our country be in the strongest possible position, not only that it may avoid future wars but that it may actually protect itself in the event of future attack. Therefore, it would seem imperative that a major plank in our national policy be the retention of a reserve of machine tools sufficient to enable us to quickly build whatever we might require in an emergency in the future.

"This means that we should not only have adequately equipped government arsenals and yards but that these units, which in time of war produce only a fraction of our total material, should be augmented by substantial reserves of machines properly stored and protected and available on a few days notice, to be placed into production of whatever type of tank, plane, gun, rocket or robot may be required.

"A great stock of tanks and planes of the type which is in use today can give us no more assurance of real protection than did the illusionary Maginot Line give to the French in 1940. We must have instead machinery available, so that we can quickly produce those weapons and articles of war.

"Our fundamental consideration should be the disposition of the government owned machines now fully mobilized for war but which may be quickly dissipated if declared surplus and offered for private use. To say that these can when necessary be reclaimed by the government and quickly mobilized for war work is to ignore the experience of the last five years. The major phase of production expansion was accomplished only through the vast production of new machine tools, which took time, and which time we may not, in the next emergency, be allowed.

"Therefore, pending more careful analysis of the entire problem, our government should retain as a minimum fifty per cent of the total machines that it owns at present.

"Those of us who are the most ardent supporters of an organization for peace enforcement must realistically submit to the fact that we cannot at this time completely demobilize our Army or Navy. Neither can we demobilize the production facilities, without which the manpower of our Army and Navy will stand helpless.

"Pending re-education of large sections of the world population as to the meaning of peace, no influence can be more potent in restraining some future gangster nation than the knowledge that this country has ready for immediate use thousands of units of production machinery capable of turning out the last word in defense materiel."

CONSTRUCTION AND ENTERPRISE

OHIO

AKRON, O.—Summit Grinding Machine Co. has been incorporated with 500 shares preferred of $100 par value and 1000 shares common $1 par value, by H. W. Schwab, 32 Elmdale avenue and associates. Mr. Schwab is agent.

CANTON, O.—Precision Tool & Machine Design Co. Inc. has been incorporated with 250 shares no par value by Donald W. Zimonick and associates. LeRoy J. Contie, First National Bank building, is agent.

CLEVELAND—Harshaw Chemical Co., 1945 East 97th street, will build a one-story 61 x 280-foot and 66 x 97-foot addition at 1000 Harvard avenue, to cost about $205,000.

CLEVELAND—Luwalt Metal Products Co., 3112 West Boulevard, will build a one-story 65 x 112-foot plant and office at 3170 Berea road, to cost, with equipment, $42,500.

CLEVELAND—Jones & Laughlin Steel Corp., Pittsburgh, has been given WPB authorization for building extensions, mill, additions to cold mill and annealing facilities, to cost about $2,700,000.

CLEVELAND—Reconstruction Finance Corp., Washington, has received WPB authorization for construction of H-type warehouse for surplus machinery and equipment storage, to cost $360,633.

ELMIRA, O.—King-Wyse Mfg. Co. has re-received WPB authorization for a two-story reinforced concrete factory building and boiler room addition, including overhead cranes, electric freight elevators, etc., for manufacture of farm implements, to cost about $215,656.

NORWOOD, O.—Fisher Body Division General Motors Corp., Detroit, has WPB authorization to install sheet metal work, sprinklers, conveyors, power and lighting wire, etc., to cost $842,932.

VAN WERT, O.—Container Co has WPB authorization to construct plant 120 x 500 square feet and install automatic welding, presses, cooling system and other equipment for production of fiber drums, to cost $741,-756.

NEW YORK

BUFFALO—Republic Steel Corp. plans erection of a $500,000 steel warehouse on a newly purchased site adjacent to its plant at South Park avenue and Buffalo river.

BUFFALO—Colonial Radio Corp., 254 Rano street, Allen H. Gardner, president, has bought 13 acres in Riverside, Calif., and

will build a plant for manufacture of radio receiving sets.

PENNSYLVANIA

SWISSVALE, PA.—Union Switch & Signal Co. has been given WPB authorization for erection of new plant building and relocation of three existing buildings in Allegheny county at cost of $207,600.

MICHIGAN

BATTLE CREEK, MICH.—Globe Mfg. & Compressor Co., Aldrich and Brooks streets, has been incorporated with $100,000 capital to manufacture automobile parts and accessories, by David W. Sutherland, 501 Second National Bank building, Battle Creek.

DETROIT—Calco Corp., 1844 Buhl building, has been incorporated with $10,000 capital to manufacture industrial equipment and supplies by William W. Crusoe, 3347 Boston boulevard.

DETROIT—American Incinerator Corp., 2434 National Bank building, has been incorporated with $10,000 capital to manufacture incinerators, by Donald F. Pascoe, same address.

FARMINGTON, MICH.—Pneumatic Equipment Co., 21405 Farmington road, has been incorporated with $10,000 capital to manufacture pneumatic and hand-operated machines, by Arthur C. Sloman, same address.

YALE, MICH.—Yale Rubber Mfg. Co. is remodeling plant formerly occupied by Roach Canning Co. and installing new equipment for manufacture of rubber hose, molded and extruded rubber goods.

WISCONSIN

APPLETON, WIS.—Appleton Machine Co. manufacturer of papermill and pulp machinery, has let contract to Hoffman Construction Co. for a one-story machine shop addition 40 x 200 feet. Orbison & Orbison are engineers.

BRILLION, WIS.—Brillion Iron Works, manufacturer of soil pulverizing machinery and pumps, is building a one-story plant addition.

GENOA, WIS.—Dairyland Power Co-Operative has been allocated $500,000 REA funds for power plant construction.

KENOSHA, WIS.—Simmons Co., manufacturer of metal beds, springs, etc., has let contract to J. P. Larson for a three-story plant addition.

MARINETTE, WIS.—Ansul Chemical Co. will let contract soon for a one-story plant 50 x 240 feet and warehouse 50 x 120 feet.

MILWAUKEE—C.P.R. Tool Works has been incorporated to manufacture machinery and tools, by Frank Corona, 8908 West Maple street, and Joseph Rody Jr.

RACINE, WIS.—Twin Disc Clutch Co., manufacturer of clutches and power takeoff units, has let contract to Johnson & Henrickson for a second-story plant addition.

RACINE, WIS.—Jacobsen Mfg. Co., manufacturer of power lawn mowers, has let contract to Peter Olson for a plant addition.

MINNESOTA

MINNEAPOLIS—Paul A. Hoagland has let contract to James Leck Co. for a one-story sheet metal stamping plant at 3031 Hiawatha avenue.

MINNEAPOLIS—Lewis Bolt & Nut Co., 504 Malcolm avenue SE, has let contract to J. H. Ganley Co. for a one-story plant addition 30 x 140 feet. Toltz, King & Day Inc., Pioneer building, St. Paul, are architects.

MINNEAPOLIS—Willard Products Corp., 111 South Second street, has been incorporated to manufacture machinery and appliances, by Ralph J. Stark and associates.

MINNEAPOLIS—Archer-Daniels-Midland Co., linseed oil manufacturers, 600 Roanoke building, has announced postwar expansion plans

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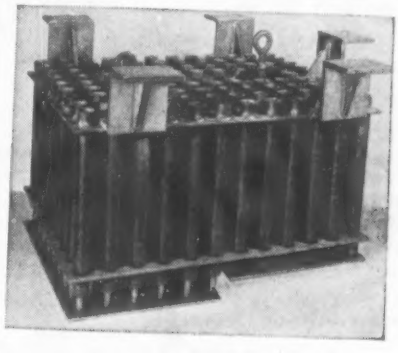

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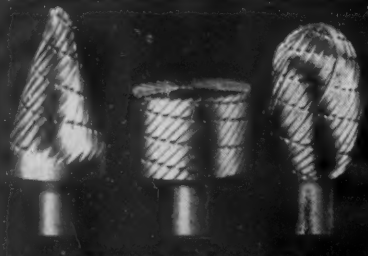

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at plants in Minneapolis and elsewhere, to cost about $5 million.

MINNEAPOLIS—Erickson Special Equipment Mfg. Co. has let contract to R. H. McGuffie for a one-story plant 60 x 90 feet for manufacture of mobile hoisting machinery.

MINNEAPOLIS—Sten Mfg. Co., 1511 South Third street, manufacturer of tools and dies, has let contract to Henry F. Olson for a one-story addition to machine shop, 50 x 55 feet.

WASECA, MINN.—E. F. Johnson Co., manufacturer of radio transmitting equipment, has let contract to H. A. Woyke & Co. for a one-story plant addition 50 x 126 feet, for sheet metal department.

WORTHINGTON, MINN.—City, G. S. Thompson, clerk, will open bids August 1 for a 4000-kw turbine-generator and surface condenser for municipal power plant.

KANSAS

COFFEYVILLE, KANS.—City, J. D. Byers, mayor, will open bids July 6 for improvements and equipment for municipal water and light plant, to cost about $130,000, first unit of expansion program for which $1,500,000 bond issue was voted. Black & Veatch, 4706 Broadway, Kansas City, Mo., are engineers.

ENTERPRISE, KANS.—J. B. Ehrsam & Sons Mfg. Co., manufacturer of plaster mixers and grinding mills, will rebuild burned foundry.

MANHATTAN, KANS.—Manhattan Viking Co., W. W. Rofsess, president, has let contract to M. J. Green for a one-story plant 150 x 200 feet for manufacture of farm machinery.

SUBLETTE, KANS.—Northern Natural Gas Co., Omaha, Nebr., has been given permission by state corporation commission to build a natural gas and liquid hydrocarbon recovery plant to cost $900,000 and a natural gas dehydration plant to cost about $210,000.

WICHITA, KANS.—Service Foundry Co. has let contract to John Friesen for a one-story plant addition 75 x 75 feet.

WICHITA, KANS.—Martin Engineering Co. has let contract to Harry Garber for one-story machine shop 50 x 95 feet.

IOWA

CEDAR RAPIDS, IOWA—Castone Products Co. has let contract to Joseph Hradek for a one-story plant 100 x 100 feet.

CEDAR RAPIDS, IOWA—Iowa Mfg. Co., manufacturer of sand and gravel screening and rock crushing machinery, has let contract to Morehead Construction Co. for a one-story shop and storage building 107 x 199 feet.

CHEROKEE, IOWA—Schissel Lawnmower Co. plans new plant when materials are available.

MARSHALLTOWN, IOWA—Lennox Furnace Co., manufacturer of heating plants, has let contract to C. F. Reimer Co. for a one-story foundry addition 100 x 150 feet.

WATERLOO, IOWA—Modern Castings Corp. has been incorporated to operate a foundry. Frank E. Arp is president and Earl W. Manning is vice president and treasurer.

CALIFORNIA

ALHAMBRA, CALIF.—Morse Motors Inc. has been incorporated with $75,000 capital by Glenn R. Morse, Garvey, Calif., and Curtis J. Schcults, San Diego, Calif. Corporation is represented by V. A. Morgan, 217 Alhambra Professional building, Alhambra.

LOS ANGELES—Fonda Machinery Co. will build a plant addition at 8460 Santa Monica boulevard, 30 x 43 feet.

LOS ANGELES—U. S. Spring & Bumper Co., 4351 Alcoa avenue, is building a 30,000-square foot addition costing about $93,000.

LOS ANGELES—International Harvester Co., 5706 Bickett street, will build an addition of 25,500 feet for manufacture of agricultural implements.

LOS ANGELES—ABC Products Inc., 119 Montana avenue, West Los Angeles, is building a plant at 2131 Stoner street, co 6500 square feet, for manufacture of parts, dies and tools.

LOS ANGELES—Western Arc Welding Co 749 Kohler street, will build a plant addition covering 10,000 square feet.

LOS ANGELES—Superior Tool & Die Mfg. Co., 4116 San Fernando road, Glendale is building a 7000-square foot addition for manufacture of dies and tools.

LOS ANGELES—Alloy Brass Foundry, 2463 East 57th street, is adding 5000 square feet for manufacture of nonferrous castings.

LOS ANGELES—Mechanical Development Co., 1000 North Orange drive, is adding 4500 square feet for manufacture of dies, jigs and stampings.

LOS ANGELES—Pacific Screw Products Co., 5211 Southern avenue, South Gate, Calif., is building an addition covering 3000 square feet.

SOUTH GATE, CALIF.—Ferris Screw Products Co. has let contract to Southern California Builders, 6055 South Western avenue, Los Angeles, for a plant 50 x 75 feet on Dolores street, to cost about $10,000.

VERNON, CALIF.—U. S. Spring & Bumper Co. will build a farm tool manufacturing plant at 4951 Alcoa avenue, to cost about $85,000.

VENICE, CALIF.—Airesearch Mfg. Co., Sepulveda boulevard, has building p for plant addition 38 x 38 and 80 x 100 to cost about $31,000.

OREGON

PORTLAND, OREG.—Automotive Produc 1700 SE Grand avenue, has let contract t Industrial builders for a shop building.

PORTLAND, OREG.—National Battery Co St. Paul, has WPB priority for erection of a plant in Oregon, 160 x 300 feet, to cost about $175,000.

PORTLAND, OREG.—Griffiths Rubber Mills Inc., 2439 NW 22nd street, has let contract to Donald M. Drake Co. for a plant building 50 x 200 feet, costing $141,219.

WASHINGTON

SEATTLE—Fruehauf Trailer & Equipment Co. plans early construction of a plant 120 x 400 feet at Sixth and Stacy streets.

SEATTLE—Puget Sound Bridge & Dredging Co., 2919 Sixteenth avenue SW. has WPB approval of erection of powerhouse 40 x 80 feet.

SEATTLE—Seattle Transit Commission has over $2 million in its replacement fund and is making plans for rehabilitation at the end of the war, including new equipment.

SPOKANE, WASH.—Inland Empire Refineries has plans for doubling capacity of its plant here. Additional drilling in the Cutbank, Mont., area and other fields will provide additional oil. Henry D. Moyle, Salt Lake City, is president.

SUNNYSIDE, WASH.—Goering & Philp, Seattle, have been awarded a contract for a sewage disposal plant to replace outgrown facilities, at cost of $156,393.

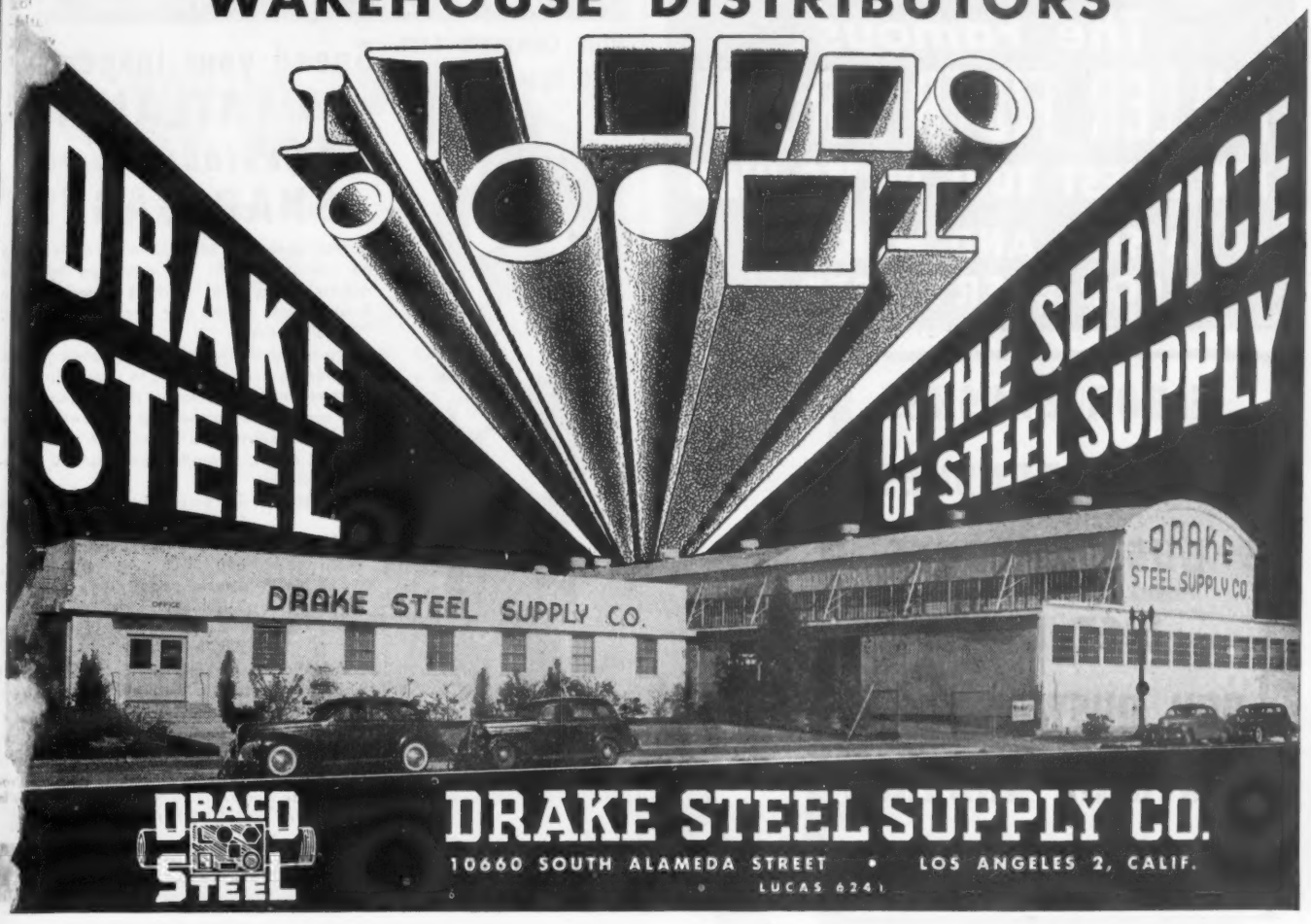
DPC Authorizes Plant Expansion, Equipment

Defense Plant Corp. has authorized the following expansions and equipment purchases (figures are approximate):

Borg-Warner Corp., Detroit, $90,000 to provide equipment at a plant in Detroit.

Western Electric Co. Inc., New York, $1,250,000 to provide equipment at a plant at Chicago.

WAREHOUSE DISTRIBUTORS



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ALLOYS

Ferro-Chrome—Calcium Silicide
Ferro Silicon—Silico Manganese

PIG IRON

FERRO MANGANESE

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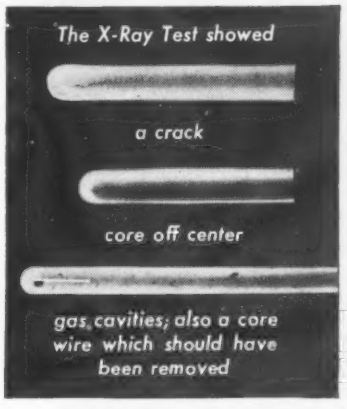

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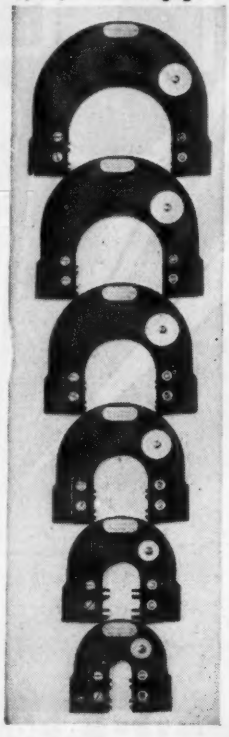

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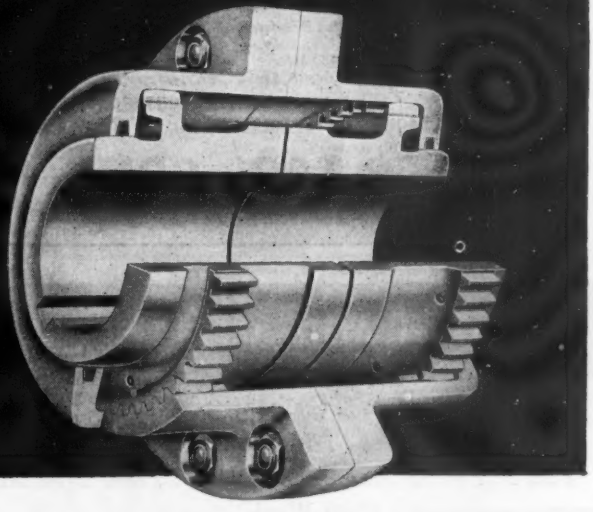

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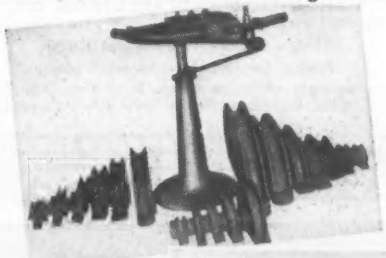

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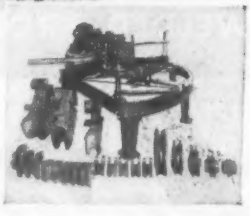

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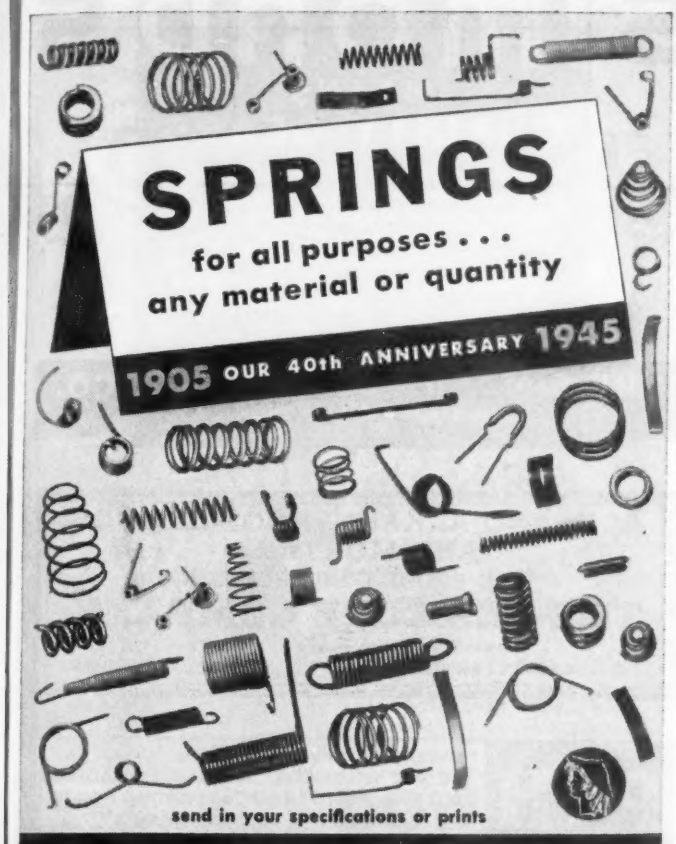

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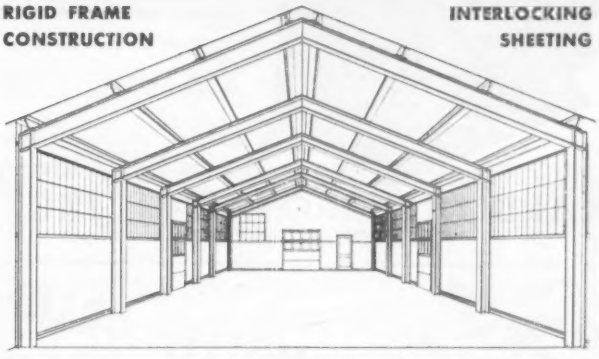

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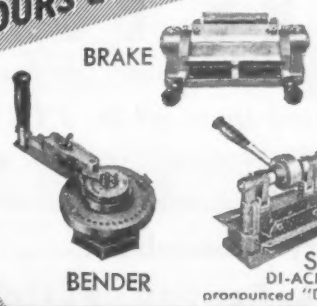

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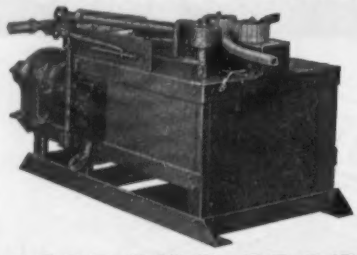

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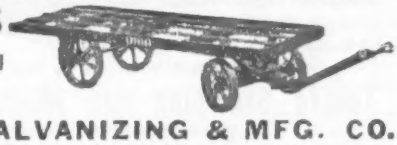

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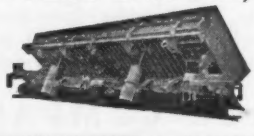

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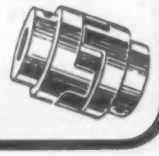

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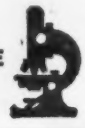
FINE  STEEL

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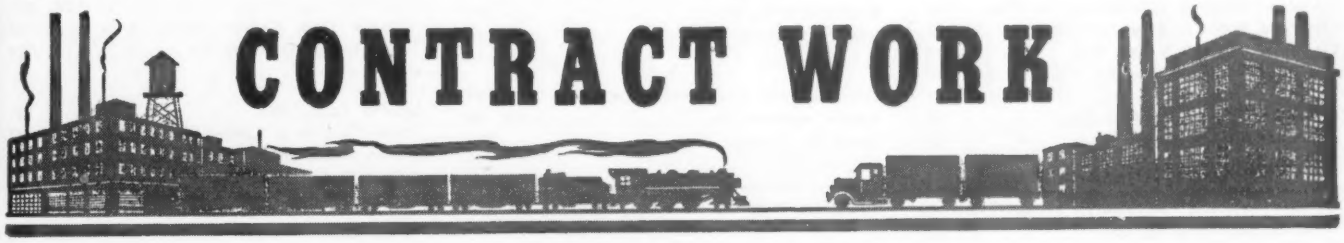

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Steel and Tubes Div. Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
U. S. Automatic Corp., Amherst, O.
Wagner, E. R., Mfg. Co., 4615 N. 32nd St., Milwaukee 9, Wis.
Weatherhead Co., The, 300 E. 131st St., Cleveland 8, O.

AIRLESS BLAST CLEANING EQUIPMENT

American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.

AIRPLANES

Consolidated Vultee Aircraft Corp., 3301 Pacific Highway, San Diego, Cal.

ALLOY METALS (Nonferrous)—See METALS (Nonferrous)

ALLOY STEELS (Heat Resistant)

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Michiana Products Corp., Michigan City, Ind.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.

ALLOYS (Ferroalloys)—See FERROALLOYS

ALLOYS (Heat Resistant)

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Haynes Stellite Co., 30 E. 42nd St., New York 17, N. Y.
Hedstrom, Oscar W., Corp., 4824 W. Division St., Chicago 51, Ill.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
International Nickel Co., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Mir-O-Col Alloy Co., 2416-30 E. 53rd St., Los Angeles 11, Cal.

ALLOYS (Magnesium)

American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Dow Chemical Co., The, Midland, Mich.

ALLOYS (Nonferrous)

Ajax Metal Co., Philadelphia 43, Pa.
American Brass Co., The, Waterbury 88, Conn.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Bunting Brass & Bronze Co., The, 715 Spencer St., Toledo 1, O.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
Haynes Stellite Co., 30 E. 42nd St., New York 17, N. Y.
Hedstrom, Oscar W., Corp., 4824 W. Division St., Chicago 51, Ill.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Mallory, P. R., & Co., Inc. 3029 E. Washington St., Indianapolis 6, Ind.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Western Brass Mills, Div. of Olin Industries, East Alton, Ill.

ALLOYS (Silver)

Handy & Harman, 82 Fulton St., New York 7, N. Y.

ALUMINUM (Screw Stock)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

ALUMINUM AND ALUMINUM ALLOYS

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Hedstrom, Oscar W., Corp., 4824 W. Division St., Chicago 51, Ill.
Reliance Steel Corp. Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

ANGLES—See BEAMS, CHANNELS, ANGLES

ANNEALING (Tempering)

Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Lakeside Steel Improvement Co., The, 5418 Lakeside Ave., Cleveland 14, O.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., New York 23, N. Y.

ANNEALING BOXES

Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Foundry & Machine Co., E. Chicago, Ind.
General American Transportation Corp., 514C Graybar Bldg., New York 17, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
National Annealing Box Co., Washington, Pa.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Rolock, Inc., 1380 Kings Highway, Fairfield, Conn.
Union Steel Castings Div. of Blaw-Knox Co., 62nd & Butler Sts., Pittsburgh 1, Pa.
United Engineering & Foundry Co., First National Bank Bldg., Pittsburgh 22, Pa.
Wean Engineering Co., Inc., The, Warren, O.
Wilson, Lee, Engineering Co., 20005 Lake Rd., Cleveland 16, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

ANNEALING COVERS

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
General American Transportation Corp., 514C Graybar Bldg., New York 17, N. Y.
National Annealing Box Co., Washington, Pa.
Pennsylvania Industrial Engineers, Div. of Union Mining Co., 2413 W. Magnolia St., Pittsburgh 12, Pa.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Wean Engineering Co., Inc., The, Warren, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

ANODES (All Types)

American Brass Co., The, Waterbury 88, Conn.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Revere Copper & Brass Inc., 230 Park Ave., New York 17, N. Y.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

ANODES (Lead & Lead Alloy)

National Lead Co., 111 Broadway New York 6, N. Y.

ANODES (Nickel)

Hanson-Van Winkle-Munning Co. Matawan, N. J.
Seymour Manufacturing Co., The, 51 Franklin St., Seymour, Conn.
Udylite Corp., The 1651 E. Grand Blvd., Detroit 11, Mich.

ANODES (Silver)

Handy & Harman, 82 Fulton St., New York 7, N. Y.

ANODES (Zinc)

Meaker Co., The, 1635 S. 55th Ave., Chicago 50, Ill.

ARCHITECTS

Associated Engineers, Inc., 230 E. Berry St., Fort Wayne 2, Ind.

ASSEMBLIES (Mechanical-Electrical)

Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.

AUTOGRAPH REGISTERS

United Autographic Register Co., 5000 S. California Ave., Chicago 32, Ill.

AUTOMOTIVE ACCESSORIES, PARTS, SUPPLIES

Bardwell & McAlister, Inc., P. O. Box 1310, Hollywood 28, Cal.
Burgess-Norton Mfg. Co., 778 Peyton St., Geneva, Ill.
Canton Drop Forging & Mfg. Co., The, Canton 2, O.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Cleveland Pneumatic Tool Co., The, 3781 E. 77th St., Cleveland 5, O.
General Electric Co., Sec. A-443-90, Tungar & Metallic Rectifier Div., Bridgeport 2, Conn.
Grammes, L. F. & Sons, Inc. Allentown, Pa.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Lewthwaite, T. H., Machine Co., Inc., 311 E. 47th St., New York 17, N. Y.
Parish Pressed Steel Co., Reading, Pa.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Standard Products Co., The, 505 Boulevard Bldg., Detroit 2, Mich.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Stewart-Warner Corp., Alemite Div., 1879 W. Diversey Blvd., Chicago 14, Ill.
U. S. Automatic Corp., Amherst, O.
Weatherhead Co., The, 300 E. 131st St., Cleveland 8, O.

AXLES

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Clark Equipment Co., Buchanan, Mich.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.

BABBITT METAL

Ajax Metal Co., Philadelphia 43, Pa.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Cadman, A. W., Mfg. Co., 28th & Smallman Sts., Pittsburgh 22, Pa.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
National Lead Co., 111 Broadway, New York 6, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Ziv Steel & Wire Co., 2945 W. Harrison St., Chicago 12, Ill.

BALANCING MACHINES

Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.

BALING PRESSES

Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Galland-Henning Manufacturing Co., 2747 S. 31st St., Milwaukee 7, Wis.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.

BALL JOINTS (Automotive and Aircraft)

Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Tourek, J. J., Mfg. Co., 4701-11 W. 16th St., Chicago 50, Ill.

BALLS (Brass or Bronze)

Atlas Ball Div., SKF Industries, Inc., Philadelphia 34, Pa.
Hoover Ball & Bearing Co., Ann Arbor, Mich.
Strom Steel Ball Co., 1850 S. 54th Ave., Cicero, Ill.

BALLS (Grinding)

Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Taylor-Wharton Iron & Steel Co., Easton, Pa.

BALLS (Special Alloy Metals)

Atlas Ball Div., SKF Industries, Inc., Philadelphia 34, Pa.

BALLS (Steel) (*Also Stainless)

*Atlas Ball Div. SKF Industries, Inc., Philadelphia 34, Pa.
Hoover Ball & Bearing Co., Ann Arbor, Mich.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
*Strom Steel Ball Co., 1850 S. 54th Ave., Cicero, Ill.

BANDS AND HOOPS (Iron and Steel)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
American Welding & Mfg. Co., The, Warren, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Cleveland Welding Co., The, W. 117th St. & Berea Rd., Cleveland 7, O.
Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Stanley Works, The, New Britain & Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.

BAR MACHINING EQUIPMENT

Pines Engineering Co., 600 Prairie St., Aurora, Ill.

BARGE MOVERS

Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.

BARGES (Steel)

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Federal Shipbuilding & Dry Dock Co., Kearny, N. J.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.

BARGES (Wood)

Koppers Co., Wood Preserving Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

BARRELS (Aluminum)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

BARRELS (Plating)

Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

BARRELS (Rubber Lined)

Goodrich, B. F., Co., The, Akron 19, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

BARRELS (Steel)

Crucible Steel Co. of America, 405 Lexington Ave., New York 17, N. Y.
Rheem Research Products, Inc., 206 Standard Oil Bldg., Baltimore 2, Md.

BARRELS (Tumbling)

Ransohoff, N., Inc., 1317 Township Ave., Cincinnati 16, O.

BARS (Alloy Steel)

Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Ampco Metal Inc., Dept. S6, Milwaukee 4, Wis.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Columbia Steel Co., San Francisco 6, Calif.
Copperweld Steel Co., Warren, O.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
International Nickel Co. Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wyckoff Steel Co., P. O. Box 1256, Pittsburgh 30, Pa.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

BARS (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh, Pa.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Dow Chemical Co., The, Midland, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

BARS (Brass, Bronze or Copper)

American Brass Co., The, Waterbury 88, Conn.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Bridgeport Brass Co., Bridgeport 2, Conn.
Bunting Brass & Bronze Co., The, 715 Spencer St., Toledo 1, O.
Copperweld Steel Co., Warren, O.
Johnson Bronze Co., 550 S. Mill St., New Castle, Pa.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.
Western Brass Mills, Div. of Olin Industries, East Alton, Ill.

BARS (Cold Finished)—See STEEL (Cold Finished)

BARS (Concrete Reinforcing)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Foster, L. B., Co., Inc., P. O. Box 1647, Pittsburgh, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

BARS (Iron)

Ryerson, Jos. T., & Sons, Inc., 16th & Rockwell Sts., Chicago 80, Ill.

BARS (Steel) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
American Petrometal Corp., 1102 Broadway at 11th St., Long Island City 2, N. Y.
*American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Benedict-Miller, Inc., 216 Clifford St., Newark 5, N. J.
*Bethlehem Steel Co., Bethlehem, Pa.
*Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
*Columbia Steel Co., San Francisco 6, Calif.
Continental Steel Corp., Kokomo, Ind.
*Copperweld Steel Co., Warren, O.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Enterprise Galvanizing Co., 3525 E. Cumberland St., Philadelphia 25, Pa.
*Firth-Sterling Steel Co., McKeesport, Pa.
*Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
*Midvale Co., The, Nicetown, Philadelphia 40, Pa.
*Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Purdy, A. R., Co., 790 Greenwich St., New York 14, N. Y.
*Republic Steel Corp., Dept. ST, Cleveland 4, O.
*Rustless Iron & Steel Corp., 3400 E. Chase St., Baltimore 13, Md.
*Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Stanley Works, The, New Britain & Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
*United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

BASES (Welded Steel)

American Welding & Mfg. Co., The, Warren, O.
Bethlehem Steel Co., Bethlehem, Pa.
Brandt, Charles T., Inc., 1702 Ridgely St., Baltimore 30, Md.
Cleveland Welding Co., The, W. 117th St. & Berea Rd., Cleveland 7, O.
Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.
Duffin Iron Company, 37 W. Van Buren St., Chicago 5, Ill.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Van Dorn Iron Works Co., 2685 E. 79th St., Cleveland 4, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

BASKETS (Perforated Metal)

Diamond Mfg. Co., Wyoming, Pa.
Stanwood Corp., 4825 W. Cortland St., Chicago 39, Ill.

BASKETS (Wire and Metal)

Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Wire Works Co., Inc., 437 Terrace Rd., Buffalo 2, N. Y.
Rolock, Inc., 1350 Kings Highway, Fairfield, Conn.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.
Stanwood Corp., 4825 W. Cortland St., Chicago 39, Ill.

BATHS (Heat Treating, Cyanide, Salt, Silicone)

Dow Corning Corp., P. O. Box 592, Midland, Mich.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Tate-Jones & Co., Inc., Leetsdale, Pa.

BATTERIES (Industrial Truck)

Philco Corp., Storage Battery Div., 467 Calhoun St., Trenton 7, N. J.

BATTERIES (Storage)

Edison Storage Battery Div. of Thomas A. Edison, Inc., West Orange, N. J.
Electric Storage Battery Co., The, 19th St. and Allegheny Ave., Philadelphia 32, Pa.
Philco Corp., Storage Battery Div., 467 Calhoun St., Trenton 7, N. J.

BATTERY CHARGING APPARATUS

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
General Electric Co., Schenectady 5, N. Y.
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

BEAMS, CHANNELS, ANGLES ETC. (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa
Dow Chemical Co., The, Midland, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

BEAMS, CHANNELS, ANGLES, ETC. (Steel) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Brackenridge, Pa.
*Bethlehem Steel Co., Bethlehem, Pa.
*Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Columbia Steel Co., San Francisco 6, Calif.
*Enterprise Galvanizing Co., 3525 E. Cumberland St., Philadelphia 25, Pa.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
*Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
*United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The Youngstown 1, O.

BEARINGS (Aluminum, Brass or Bronze)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Ampco Metal Inc., Dept S6, Milwaukee 4, Wis.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Bunting Brass & Bronze Co., The, 715 Spencer St., Toledo 1, O.
Cadman, A. W., Mfg. Co., 28th & Smallman Sts., Pittsburgh 22, Pa.
Johnson Bronze Co., 550 S. Mill St., New Castle, Pa.
Moraine Products Div., General Motors Corp., Dayton 1, O.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.

BEARINGS (Babbitt)

Bunting Brass & Bronze Co., The, 715 Spencer St., Toledo 1, O.
Johnson Bronze Co., 550 S. Mill St., New Castle, Pa.
Link-Belt Co., 2410 W. 18th St., Chicago 8, Ill.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Moraine Products Div., General Motors Corp., Dayton 1, O.
National Lead Co., 111 Broadway New York 6, N. Y.

BEARINGS (Ball)

Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Bearings Co. of America, Lancaster, Pa.
Burgess-Norton Mfg. Co., 778 Peyton St., Geneva, Ill.
Dodge Manufacturing Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hoover Ball & Bearing Co., Ann Arbor, Mich.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich
Link-Belt Co., 519 N. Holmes Ave., Indianapolis 6, Ind.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.
New Departure, Div. of General Motors Corp., Bristol, Conn.
Norma-Hoffman Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia 34, Pa.

BEARINGS (Graphite)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
United States Graphite Co., The, Saginaw, Mich.

BEARINGS (Journal)

Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Dodge Manufacturing Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Link-Belt Co., 2410 W. 18th St., Chicago 8, Ill.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
National Lead Co., 111 Broadway, New York 6, N. Y.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Rollway Bearing Co., Inc., 541 Seymour St., Syracuse 4, N. Y.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia 34, Pa.
Timken Roller Bearing Co., The, Canton 6, O.

BEARINGS (Needle)

Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Torrington Co., The, Torrington, Conn.

BEARINGS (Nonmetallic)

Goodrich, B. F., Co., The, Akron 19, O.
Harris Products Co., 5105. Cowan Ave., Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.

BEARINGS (Oilless)

Johnson Bronze Co., 550 S. Mill St., New Castle, Pa.
Moraine Products Div., General Motors Corp., Dayton 1, O.
Rhoades, R. W., Metaline Co., Inc., 50-17 Fifth St., Long Island City 1, N. Y.

BEARINGS (Quill)

Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.

BEARINGS (Radial)

American Roller Bearing Co., 420 Melwood St., Pittsburgh 13, Pa.
Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Bearings Co. of America, Lancaster, Pa.
Fafnir Bearing Co., New Britain, Conn.
Hoover Ball & Bearing Co., Ann Arbor, Mich.
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Link-Belt Co., 519 N. Holmes Ave., Indianapolis 6, Ind.
Medart Co., The 3500 DeKalb St., St. Louis 18, Mo.
New Departure, Div. of General Motors Corp., Bristol, Conn.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Rollway Bearing Co., Inc., 541 Seymour St., Syracuse 4, N. Y.
Shafer Bearing Corp., 1418 W. Washington Blvd., Chicago 7, Ill.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia 34, Pa.
Timken Roller Bearing Co., The, Canton 6, O.

BEARINGS (Roll Neck)

American Roller Bearing Co., 416 Melwood St., Pittsburgh 13, Pa.
Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich
Morgan Construction Co., Worcester 5, Mass.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Rollway Bearing Co., Inc., 541 Seymour St., Syracuse 4, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia 34, Pa.
Timken Roller Bearing Co., The, Canton 6, O.

BEARINGS (Roller)

American Roller Bearing Co., 416 Melwood St., Pittsburgh 13, Pa.
Atlantic Gear Works, 200 Lafayette St., New York 12, N. Y.
Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Dodge Manufacturing Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hoover Ball & Bearing Co., Ann Arbor, Mich.
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Link-Belt Co., 519 N. Holmes Ave., Indianapolis 6, Ind.
Medart Co., The 3500 DeKalb St., St. Louis 18, Mo.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Rollway Bearing Co., Inc., 541 Seymour St., Syracuse 4, N. Y.
Shafer Bearing Corp., 1418 W. Washington Blvd., Chicago 7, Ill
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia 34, Pa.
Timken Roller Bearing Co., The, Canton 6, O.

BEARINGS (Roller Tapered)

Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Dodge Manufacturing Corp., Mishawaka, Ind.
Hoover Ball & Bearing Co., Ann Arbor, Mich.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Medart Co., The 3500 DeKalb St., St. Louis 18, Mo.
Timken Roller Bearing Co., The, Canton 6, O.

BEARINGS (Rolling Mill)

American Roller Bearing Co., 416 Melwood St., Pittsburgh 13, Pa.
Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Link-Belt Co., 519 N. Holmes Ave., Indianapolis 6, Ind.
Morgan Construction Co., Worcester 5, Mass.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Shafer Bearing Corp., 1418 W. Washington Blvd., Chicago 7, Ill.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia 34, Pa.
Timken Roller Bearing Co., The, Canton 6, O.

BEARINGS (Sealed)

Bearings Co. of America, Lancaster, Pa.
Hoover Ball & Bearing Co., Ann Arbor, Mich.
New Departure, Division of General Motors, Bristol, Conn.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Shafer Bearing Corp., 1418 W. Washington Blvd., Chicago 7, Ill.

BEARINGS (Silver)

Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.

BEARINGS (Shaft Hanger)

Dodge Manufacturing Corp., Mishawaka, Ind.
Link-Belt Co., 519 N. Holmes Ave., Indianapolis 6, Ind.
Medart Co., The 3500 DeKalb St., St. Louis 18, Mo.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Shafer Bearing Corp., 1418 W. Washington Blvd., Chicago 7, Ill.

BEARINGS (Thrust)

American Roller Bearing Co., 416 Melwood St., Pittsburgh 13, Pa.
Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Bearings Co. of America, Lancaster, Pa.
Fafnir Bearing Co., New Britain, Conn.
Hoover Ball & Bearing Co., Ann Arbor, Mich.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Rollway Bearing Co., Inc., 541 Seymour St., Syracuse 4, N. Y.
Shafer Bearing Corp., 1418 W. Washington Blvd., Chicago 7, Ill.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia 34, Pa.
Timken Roller Bearing Co., The, Canton 6, O.

BELL HOISTS

Otis Elevator Co., 260 11th Ave., New York 1, N. Y.

BELTING (Conveyor)

Boston Woven Hose & Rubber Co., P.O. Box 1071, Boston 3, Mass.
Goodrich, B. F., Co., The, Akron 19, O.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

BELTING (Flat Transmission)

Boston Woven Hose & Rubber Co., P.O. Box 1071, Boston 3, Mass.
Goodrich, B. F., Co., The, Akron 19, O.
Graton & Knight Co., 322 Franklin St., Worcester 4, Mass.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Manheim Mfg. & Belting Co., Manheim, Pa.

BELTING (V-Drive)

Gates Rubber Co., The, 999 S. Broadway, Denver 17, Colo.
Goodrich, B. F. Co., The, Akron 19, O.
Manheim Mfg. & Belting Co., Manheim, Pa.

BENDING AND STRAIGHTENING MACHINES

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Alliance Machine Co., The, Alliance, O.
American Broach & Machine Co., Ann Arbor, Mich.
American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., Hammond, Ind.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Cleveland Crane & Engineering Co., The, Steelweld Machinery Div., The, 1125 E. 283rd St., Wickliffe, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Consolidated Machine Tool Corp., 565 Blossom Road, Rochester 10, N. Y.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Kardong Bros., Inc., 346 Buchanan St., Minneapolis 13, Minn.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Lewis Machine Co., 3450 E. 76th St., Cleveland 4, O.
Lewthwaite, T. H., Machine Co., Inc., 311 E. 47th St., New York 17, N. Y.
Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13, Ill.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
Medart Co., The 3500 DeKalb St., St. Louis 18, Mo.
Morgan Engineering Co., The, Alliance, O.
O'Neil-Irwin Mfg. Co., 304 8th Ave. S., Minneapolis 15, Minn.
Pines Engineering Co., 600 Prairie St., Aurora, Ill.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
Watson-Stillman Co., Roselle, N. J.
Wean Engineering Co., Inc., The, Warren, O.
Webb Corp., The, Webb City, Mo.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

BENZOL AND TOLUOL RECOVERY PLANTS

Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

BIFURCATORS

DeBothezat Fans, Div. American Machine & Metals Co., East Moline, Ill.

BILLETS (Forging)

Alan Wood Steel Co., Conshohocken, Pa.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Copperweld Steel Co., Warren, O.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Harrisburg Steel Corp., Harrisburg, Pa.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Stanley Works, The, New Britain & Bridgeport, Conn.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

BILLETS AND BLOOMS (Alloy & Carbon Steel) (*Also Stainless)

*Alan Wood Steel Co., Conshohocken, Pa.
*Allegheny Ludlum Steel Corp., Brackenridge, Pa.
*Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
*Copperweld Steel Co., Warren, O.
Firth-Sterling Steel Co., McKeesport, Pa.
*Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Harrisburg Steel Corp., Harrisburg, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
*Midvale Co., The, Nicetown, Philadelphia 40, Pa.
*Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
*Republic Steel Corp., Dept. ST, Cleveland 4, O.
Roebling's, John A., Sons Co., Trenton, N. J.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Stanley Works, The, New Britain & Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Washburn Wire Co., Phillipsdale, R. I.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

BILLETS—ALUMINUM (Forging)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

BIMETALS

Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.

BLACKING (Graphite)

United States Graphite Co., The, Saginaw, Mich.

BLAST FURNACE AIR CONDITIONING

Associated Engineers, Inc., 230 E. Berry St., Fort Wayne 2, Ind.
Koppers Co., Engineering & Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.

BLAST FURNACE CLEANING (Gas)

McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.

BLAST FURNACE HOISTS

Otis Elevator Co., 260 11th Ave., New York 1, N. Y.

BLAST FURNACE SPECIALTIES

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Brosius, Edgar E. Co., Sharpsburg P. O., Pittsburgh 15, Pa.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.

BLAST FURNACE STOCK HOUSES

McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.

BLAST FURNACE STOVES

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.

BLAST FURNACES

McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O

BLOCKS (Chain)

Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.

BLOW PIPE SYSTEMS

Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.

BLOW PIPES (Oxy-Acetylene)

Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

BLOWERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
DeLaval Steam Turbine Co., Trenton, N. J.
General Blower Co., 404 N. Peoria St., Chicago 22, Ill.
General Electric Co., Schenectady 5, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.

BLUE PRINTING MACHINES AND ACCESSORIES

Wickes Brothers, Saginaw, Mich.

BODIES (Truck-Detachable)

Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.

BOILER HEADS

Bethlehem Steel Co., Bethlehem, Pa.

BOILERS (Water Tube)

Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.

BOILER TUBES—See TUBES (Boiler)

BOLT AND NUT MACHINERY

Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Landis Machine Co., Waynesboro, Pa.
Murchey Machine & Tool Co., 951 Porter St., Dept. L, Detroit 26, Mich.
National Machinery Co., The, Tiffin, O.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.

BOLTS (*Also Stainless)

Bethlehem Steel Co., Bethlehem, Pa.
Boss Bolt & Nut Co., Div. of The Lock Nut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Cleveland Cap Screw Co., The, 2935 E. 79th St., Cleveland 4, O.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
*Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
*Industrial Steels, Inc., 246-258 Burt St., Cambridge 41, Mass.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
*National Screw & Mfg. Co., the, 2440 E. 75th St., Cleveland 4, O.
*Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
*Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
*Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.

BOLTS (Carriage and Machine)

Bethlehem Steel Co., Bethlehem, Pa.
Boss Bolt & Nut Co., Div. of The Lock Nut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Cleveland Cap Screw Co., The, 2935 E. 79th St., Cleveland 4, O.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Triplex Screw Co., 5341 Grant Ave., Cleveland 5, O.

BOLTS (Connecting Rod)

Bethlehem Steel Co., Bethlehem, Pa.
Boss Bolt & Nut Co., Div. of The Lock Nut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
U. S. Automatic Corp., Amherst, O.

BOLTS (Nonferrous)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
National Screw & Mfg. Co., The, 2440 E. 75 St., Cleveland 4, O.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
U. S. Automatic Corp., Amherst, O.

BOLTS (Shackle)

Bethlehem Steel Co., Bethlehem, Pa.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Cleveland Cap Screw Co., The, 2935 E. 79th St., Cleveland 4, O.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Russell, Burdsall, & Ward Bolt & Nut Co., Port Chester, N. Y.
Triplex Screw Co., 5341 Grant Ave., Cleveland 5, O.
U. S. Automatic Corp., Amherst, O.

BOLTS (Special)

Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.

BOLTS (Special) (Con.)

Cleveland Cap Screw Co., The, 2935 E. 79th St., Cleveland 4, O.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 8, Pa.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
U. S. Automatic Corp., Amherst, O.

BOLTS (Spring)

Bethlehem Steel Co., Bethlehem, Pa.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Cleveland Cap Screw Co., The, 2935 E. 79th St., Cleveland 4, O.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
Russell, Burdsall, & Ward Bolt & Nut Co., Port Chester, N. Y.
Triplex Screw Co., 5341 Grant Ave., Cleveland 5, O.
U. S. Automatic Corp., Amherst, O.

BOLTS (Stove)

American Screw Company, Providence 1, R. I.
Boss Bolt & Nut Co., Div. of The Lock Nut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Cleveland Cap Screw Co., The, 2935 E. 79th St., Cleveland 4, O.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Triplex Screw Co., 5341 Grant Ave., Cleveland 5, O.

BOLTS (Stove, Recessed Head)

American Screw Co., Providence 1, R. I.
Bristol Co., Waterbury 91, Conn.
Chandler Products Co., Euclid 17, O.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., 2440 E. 75th St., Cleveland 4, O.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Mfg. Co., Waterbury, Conn.
U. S. Automatic Corp., Amherst, O.

BOLTS (Track)

Bethlehem Steel Co., Bethlehem, Pa.
Boss Bolt & Nut Co., Div. of The Lock Nut Corp. of America, 3403 W. 47th St., Chicago, Ill.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.

BORING BARS

Bokum Tool Co., 14775 Wildermere Ave., Detroit 21, Mich.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

BORING BARS (Con.)

Universal Engineering Co., Frankenmuth, Mich.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

BORING MILLS

Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Heald Machine Co., The, Worcester 6, Mass.
Moline Tool Co., 102 20th St., Moline, Ill.
Stokerunit Corp., 4548 W. Mitchell St., Milwaukee 14, Wis.

BORING MILLS (Vertical)

Bullard Co., The, Bridgeport 2, Conn.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Moline Tool Co., 102 20th St., Moline, Ill.

BORING TOOLS (Carbide Tipped)

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Spe-D-Cut Tool Co., 9th & Lyon Sts., Hannibal, Mo.

BOXES (Export)

Morgan Lumber Sales Co., 8 East Long St., Columbus, O.
Rathborne, Hair & Ridgway Co., 1440 W. 21st Place, Chicago 8, Ill.

BOXES (Open Hearth Charging)

Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Foundry & Machine Co., E. Chicago, Ind.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Union Steel Castings Div., Blaw-Knox Co., 62nd & Butler Sts., Pittsburgh 1, Pa.

BOXES (Wire Bound)

Rathborne, Hair & Ridgway Co., 1440 W. 21st Place, Chicago 8, Ill.

BOXES (Wood)

Morgan Lumber Sales Co., 8 E. Long St., Columbus, O.
Rathborne, Hair & Ridgway Co. 1440 W. 21st Place, Chicago 8, Ill.

BRAKE DRUMS

Bethlehem Steel Co., Bethlehem, Pa.
Ladish Drop Forge Co., Cudahy, Wis.

BRAKE LININGS

Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

BRAKES (Electric)

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.

BRAKES (Hand)

O'Neil-Irwin Mfg. Co., 304 8th Ave. So., Minneapolis 15, Minn.

BRAZING

Burgess-Norton Mfg. Co., 778 Peyton St., Geneva, Ill.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.

BRAZING (Copper Hydrogen)

Burgess-Norton Mfg. Co., 778 Peyton St., Geneva, Ill.

BRICK (Abrasive)

Chicago Wheel & Manufacturing Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Norton Co., Worcester 6, Mass.
Safety Grinding Wheel & Machine Co., P. O. Box 746, Springfield, O.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.

BRICK (Acid Resisting)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.

BRICK (Chrome)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

BRICK (Fire Clay)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Remmey, Richard C., Son Co., Hedley St. & Delaware River, Philadelphia 37, Pa.

BRICK (Forsterite)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

BRICK (High Alumina)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

BRICK (Insulating)—See INSULATING BRICK

BRICK (Ladle)

Globe Brick Co., The, East Liverpool, O.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

BRICK (Magnesia)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

BRICK (Refractory)—See REFRACTORIES, CEMENT, ETC.

BRICK (Silica)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

BRICK (Silicon Carbide)

Carborundum Co., The, Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Norton Co., Worcester 6, Mass.

BRICK (Sleeves, Nozzles, Runners, Tuyeres)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
National Fireproofing Corp., 202 E. Ohio St., Pittsburgh 12, Pa.

BRIDGE CRANES (Ore and Coal Handling)—See CRANES—BRIDGE (Ore & Coal Handling)

BRIDGES, BUILDINGS, VIADUCTS, STACKS, ETC.

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Bedford Foundry & Mach. Co., Bedford, Ind.
Belmont Iron Works, 22nd St. and Washington Ave., Philadelphia 46, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Duffin Iron Company, 37 W. Van Buren St., Chicago 5, Ill.
General American Transportation Corp., 514C Graybar Bldg., New York 17, N. Y.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Stran Steel Div., Great Lakes Steel Corp., 607 Shelby Ave., Detroit, Mich.

BRIQUETTING MACHINES

Vulcan Iron Works, Wilkes-Barre, Pa.

BROACHES

American Broach & Machine Co., Ann Arbor, Mich.
Bethlehem Steel Co., Bethlehem, Pa.
Colonial Broach Co., P. O. Box No. 37, Harper Sta., Detroit 13, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.
Vinco Corp., Schaefer and Joy Rds., Detroit 27, Mich.

BROACHING MACHINES

American Broach & Machine Co., Ann Arbor, Mich.
Cincinnati Milling Machine Co., Cincinnati 9, O.
Colonial Broach Co., P. O. Box No. 37, Harper Sta., Detroit 13, Mich.

BROACHING PRESSES (Hydraulic)

American Broach & Machine Co., Ann Arbor, Mich.

BRUSHES (Carbon)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
United States Graphite Co., The, Saginaw, Mich.

BRUSHES (Industrial)

Fuller Brush Co., The, Industrial Div., 8c, 3582 Main St., Hartford 2, Conn.
Pittsburgh Plate Glass Co., Brush Div., 3221 Frederick Ave., Baltimore 29, Md.

BUCKETS (Clam Shell, Dragline, Grab, Single Line)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Blaw-Knox Division of Blaw-Knox Co., Blawnox, Pa.
Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.
Erie Steel Construction Co., Erie, Pa.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Osgood Co., The, Marion, O.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Taylor-Wharton Iron & Steel Co., Easton, Pa.

BUCKETS (Electric)

Erie Steel Construction Co., Erie, Pa.
Owen Bucket Co., 6013 Breakwater Ave., Cleveland, O.

BUCKETS (Elevator)

Bartlett, C. O., & Snow Co., The 6200 Harvard Ave., Cleveland 5, O.
Diamond Mfg. Co., Wyoming, Pa.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Robins Conveyors, Inc., 262 Passaic Ave, Passaic, N. J.

BUCKETS (Rubber)

Goodrich, B. F., Co., The, Akron 19, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

BUCKETS (Single Hook, Automatic Dump, Automatic Single Line)

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Brosius, Edgar E. Co., Sharpsburg P. O., Pittsburgh 15, Pa.
Erie Steel Construction Co., Erie, Pa.
Owen Bucket Co., 6013 Breakwater Ave., Cleveland, O.

BUFFERS (Electric Portable)

Chicago Wheel & Manufacturing Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.

BUILDINGS (Steel)—See BRIDGES BUILDINGS, ETC.

BULLDOZERS

Beatty Machine & Mfg. Co., Hammond, Ind.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
Watson-Stillman Co., Roselle, N. J.

BURNERS (Acetylene)—See TORCHES AND BURNERS

BURNERS (Automatic)

Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore 2, Md.
Mahr Mfg. Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Wilson, Lee, Engineering Co., Inc., 20005 Lake Rd., Cleveland 16, O.

BURNERS (Pulverized Coal, Oil, Gas, Combination, Sawdust)

Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Commercial Iron Works, P. O. Box 2230, Portland 14, Oreg.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Holden, A. F., Co., 200 Winchester Ave., New Haven 8, Conn.
Johnson Gas Appliance Co., 626 "E" Ave., N.W., Cedar Rapids, Iowa.
Maehler, Paul, Co., The, 2208 W. Lake St., Chicago 12, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Tate-Jones & Co., Inc., Leetsdale, Pa.
Wilson, Lee, Engineering Co., Inc., 20005 Lake Rd., Cleveland 16, O.

BURNERS (Steel)

Commercial Iron Works, P. O. Box 2230, Portland 14, Oreg.

BURNISHING, GRINDING, LAPPING OR POLISHING COMPOUNDS

Carborundum Co., The, Niagara Falls, N. Y.
Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.
Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.
Sun Oil Co., Dept. 1, 1608 Walnut St., Philadelphia 3, Pa.

BURRING MACHINES (Pipe & Tube)

Pines Engineering Co., 600 Prairie St., Aurora, Ill.

BUSHINGS (Bronze)

Ampco Metal Inc., Dept S6, Milwaukee 4, Wis.
Cadman, A. W., Mfg. Co., 28th & Smallman St., Pittsburgh 22, Pa.
Johnson Bronze Co., 550 S. Mill St., New Castle, Pa.
Moraine Products Div., General Motors Corp., Dayton 1, O.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.
Wagner, E. R., Mfg. Co., 4615 N. 32nd St., Milwaukee 9, Wis.

BUSHINGS (Jig)

Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Haynes Stellite Co., 30 E. 42nd St. New York 17, N. Y.
Universal Engineering Co., Frankenmuth, Mich.
Vinco Corp., Schaefer and Joy Rds., Detroit 27, Mich.

BUSHINGS (Oilless)

Moraine Products Div., General Motors Corp., Dayton 1, O.
Rhoades, R. W., Metaline Co., Inc., 50-17 Fifth St., Long Island City 1, N. Y.

BUSHINGS (Silver)

Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.

BUTTS

Veeder-Root, Inc., Hartford 2, Conn.
Wagner, E. R., Mfg. Co., 4615 N. 32nd St., Milwaukee 9, Wis.

BY-PRODUCT PLANTS

Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

CABINETS (Refrigeration)

General Electric Company (Air Conditioning & Commercial Refrigeration Div., Sec. 4412), Bloomfield, N. J.
Motor Products Corp., Deep Freeze Div., 2309-7 Davis St., N. Chicago, Ill.
Westinghouse Electric Corp., Mansfield, O.

CABINETS (Steel)

Brandt, Charles T., Inc., 1702 Ridgely St., Baltimore 30, Md.
Mullins Mfg. Co., Warren, O.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.
Republic Steel Corp., Berger Mfg. Div., Canton 5, O.

CABLE (Electric)—See WIRE & CABLE (Electric)

CADMIUM

American Zinc, Lead & Smelting Co., 943 Paul Brown Building, St. Louis 1, Mo.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

CADMIUM PLATING PROCESSES AND EQUIPMENT

Hanson-Van Winkle-Munning Co., Matawan, N. J.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

CALCIUM METAL AND ALLOYS

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.

CAMERAS

Eastman Kodak Co., 343 State St., Rochester 4, N. Y.

CAMSHAFTS

Canton Drop Forging & Mfg. Co., The, Canton 2, O.
Ladish Drop Forge Co., Cudahy, Wis.

CAP SCREWS—See SCREWS (Cap, Set, Safety-Set)

CAPACITORS (Electric)

Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.

CAPSTANS (Electric, Gasoline, Diesel)

Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.

CAR DUMPERS

Alliance Machine Co., The, Alliance, O.
Industrial Brownhoist Corp., Bay City, Mich.
Link-Belt Co., 300 W. Pershing Road, Chicago 9, Ill.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.

CAR PULLERS and SPOTTERS

Bartlett, C. O., & Snow Co., The 6200 Harvard Ave., Cleveland 5, O.
Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.
Link-Belt Co., 2410 W. 18th St., Chicago 8, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.
Vulcan Iron Works, Wilkes-Barre, Pa.

CARBIDE

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
National Carbide Corp., 60 E. 42nd St., New York 17, N. Y.
Shawinigan Products Corp., Empire State Bldg., New York 1, N. Y.

CARBIDE METALS (Special Parts)

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Vascoloy-Ramet Corp., N. Chicago, Ill.

CARBIDE TOOLS (Steel Cutting)

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Tung-Tip Tools Div., Lowell & Grayson, Monrovia, Cal.
Vascoloy-Ramet Corp., N. Chicago, Ill.
Ziv Steel & Wire Co., 2945 W. Harrison St., Chicago 12, Ill.

CARBON SPECIALTIES

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
United States Graphite Co., The, Saginaw, Mich.

CARBURIZING (Pack or Gas)

Burgess-Norton Mfg. Co., 778 Peyton St., Geneva, Ill.
Commercial Metals Treating, Inc., 177 S. St. Clair St., Toledo 1, O.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Lakeside Steel Improvement Co., The, 5418 Lakeside Ave., Cleveland 14, O.
U. S. Automatic Corp., Amherst, O.

CARS (Charging)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Foundry & Machine Co., E. Chicago, Ind.
Morgan Engineering Co., The, Alliance, O.

CARS (Dump)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Bethlehem Steel Co., Bethlehem, Pa.
Differential Steel Car Co., Findlay, O.
Easton Car & Construction Co., Easton, Pa.
Pressed Steel Car Co., Inc., (Industrial Div.) Grant Bldg., Pittsburgh 19, Pa.

CARS (Hot Metal Transfer)

Bartlett Hayward Div., Koppers Co., Baltimore 3, Md.

CARS (Industrial and Mining)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Differential Steel Car Co., Findlay, O.
Easton Car & Construction Co., Easton, Pa.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Pressed Steel Car Co., Inc., (Industrial Div.) Grant Bldg., Pittsburgh 19, Pa.

CARS (Scale)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.

CASTERS

Rapids Standard Co., Inc., The, Peoples Natl. Bank Bldg., Grand Rapids 2, Mich.

CASTING WASHER EQUIPMENT

Pangborn Corporation, Hagerstown, Md.

CASTINGS (Acid Resisting)

Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
Ampco Metal Inc., Dept. S6, Milwaukee 4, Wis.
Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Cadman, A. W., Mfg. Co., 28th & Smallman St., Pittsburgh 22, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Haynes Stellite Co., 30 E. 42nd St., New York 17, N. Y.
Hedstrom, Oscar W., Corp., 4824 W. Division St., Chicago 51, Ill.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
Mechanite Research Institute, Pershing Bldg., New Rochelle, N. Y.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Mir-O-Col Alloy Co., 2416-30 E. 53rd St., Los Angeles 11, Cal.
National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Ohio Steel Foundry Co., Lima & Springfield, O.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.

CASTINGS (Alloy Iron)

Bethlehem Steel Co., Bethlehem, Pa.
Commercial Iron Works, P. O. Box 2230, Portland 14, Oreg.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Mechanite Research Institute, Pershing Bldg., New Rochelle, N. Y.
Mir-O-Col Alloy Co., 2416-30 E. 53rd St., Los Angeles 11, Cal.
National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa.

CASTINGS (Alloy Steel)

Advance Foundry Co., The, 100 Parnell Ave., Dayton 3, O.
Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Foundry & Machine Co., E. Chicago, Ind.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
Mesta Machine Co., P. O. Box 1460, Pittsburgh 30, Pa.
Michiana Products Co., Michigan City, Ind.
National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa.
Ohio Steel Foundry Co., Lima & Springfield, O.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Union Steel Castings Div. of Blaw-Knox Co., 62nd & Butler Sts., Pittsburgh 1, Pa.
United Engineering & Foundry Co., 1st National Bank Bldg., Pittsburgh 22, Pa.

CASTINGS (Aluminum, Brass, Bronze, Copper)

Acme Aluminum Alloys Inc., 232 Findlay St., Dayton 3, O.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.
Ampco Metal Inc., Dept. S6, Milwaukee 4, Wis.

CASTINGS (Aluminum, Brass, Bronze, Copper) (Con.)

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Bethlehem Steel Co., Bethlehem, Pa.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Bunting Brass & Bronze Co., The, 715 Spencer St., Toledo 1, O.
Cadman, A. W., Mfg. Co., 28th & Smallman St., Pittsburgh 22, Pa.
Century Foundry Co., 3727 Market St., St. Louis 10, Mo.
Commercial Iron Works, P. O. Box 2230, Portland 14, Oreg.
Hedstrom, Oscar W., Corp., 4824 W. Division St., Chicago 51, Ill.
Homestead Valve Mfg. Co., P. O. Box 22, Coraopolis, Pa.
Johnson Bronze Co., 550 S. Mill St., New Castle, Pa.
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Permold Co., The, 830 W. Liberty St., Medina, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.
Titan Metal Mfg. Co., Bellefonte, Pa.
Wellman Bronze & Aluminum Co., The, 2539 E. 93 St., Cleveland 4, O.

CASTINGS (Centrifugal)

Ampco Metal Inc., Dept. S6, Milwaukee 4, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
Michiana Products Co., Michigan City, Ind.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Ohio Steel Foundry Co., Lima, O.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.

CASTINGS (Corrosion Resisting)

Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Haynes Stellite Co., 30 E. 42nd St., New York 17, N. Y.
Hedstrom, Oscar W., Corp., 4824 W. Division St., Chicago 51, Ill.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
Mechanite Research Institute, Pershing Bldg., New Rochelle, N. Y.
Michiana Products Corp., Michigan City, Ind.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Mir-O-Col Alloy Co., 2416-30 E. 53rd St., Los Angeles 11, Cal.
National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa.
National Lead Co., 111 Broadway, New York 6, N. Y.
Ohio Steel Foundry Co., Lima & Springfield, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.

CASTINGS (Electric Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Clark Equipment Co., Buchanan, Mich.
Continental Foundry & Machine Co., E. Chicago, Ind.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
Ohio Steel Foundry Co., Lima & Springfield, O.
Reading Steel Casting Div. of American Chain & Cable Co., Inc., Reading, Pa.

CASTINGS (Gray Iron, Alloy or Semi-Steel)

Advance Foundry Co., The, 100 Parnell Ave., Dayton 3, O.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Bedford Foundry & Mach. Co., Bedford, Ind.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Century Foundry Co., 3727 Market St., St. Louis 10, Mo.
Columbia Steel Co., San Francisco 6, Calif.
Commercial Iron Works, P. O. Box 2230, Portland 14, Oreg.
Davenport-Besler Corp., Davenport, Iowa
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Mahr Mfg. Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Mechanite Research Institute, Pershing Bldg., New Rochelle, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Oil Well Supply Co., Dallas 1, Tex.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.

CASTINGS (Heat Resisting)

Advance Foundry Co., The, 100 Parnell Ave., Dayton 3, O.
Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Haynes Stellite Co., 30 E. 42nd St., New York 17, N. Y.
Hedstrom, Oscar W., Corp., 4824 W. Division St., Chicago 51, Ill.
International Nickel Co. Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
Mechanite Research Institute, Pershing Bldg., New Rochelle, N. Y.
Michiana Products Co., Michigan City, Ind.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Mir-O-Col Alloy Co., 2416-30 E. 53rd St., Los Angeles 11, Cal.
National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa.
Ohio Steel Foundry Co., Lima & Springfield, O.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.

CASTINGS (Magnesium)

Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Dow Chemical Co., The, Midland, Mich.
Light Metals, Inc., 1100-1198 E. 24th St., Indianapolis 5, Ind.
Wellman Bronze & Aluminum Co., The, 2539 E. 93rd St., Cleveland 4, O.

CASTINGS (Malleable)

American Chain Div., American Chain & Cable Co. Inc., York, Pa.
Lake City Malleable Co., The, 5026 Lakeside Ave., Cleveland 14, O.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Mir-O-Col Alloy Co., 2416-30 E. 53rd St., Los Angeles 11, Cal.
Saginaw Malleable Iron Div. General Motors Corp., Saginaw, Mich.

CASTINGS (Permanent-Mold)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Permold Co., The, 830 W. Liberty St., Medina, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Stewart-Warner Corp., Stewart Die Casting Div., 1828 W. Diversey Blvd., Chicago 14, Ill.

CASTINGS (Steel) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Cal.
Continental Foundry & Machine Co., E. Chicago, Ind.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
*Lebanon Steel Foundry, Lebanon, Pa.
Mackintosh-Hemphill Co., 9th & Bingham Sts., Pittsburgh 3, Pa.
Mesta Machine Co., P. O. Box 1466 Pittsburgh 30, Pa.
*Michiana Products Co., Michigan City, Ind.
*Midvale Co., The, Nicetown, Philadelphia 40, Pa.
*Ohio Steel Foundry Co., Lima & Springfield, O.
Oil Well Supply Co., Dallas 1, Tex.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Saginaw Malleable Iron Div. General Motors Corp., Saginaw, Mich.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Steel Founders' Society of America, 920 Midland Bldg., Cleveland 15, O.
Strong Steel Fdry. Co., Hertel & Norris Aves., Buffalo 7, N. Y.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Union Steel Castings Div. of Blaw-Knox Co., 62nd and Butler Sts., Pittsburgh 1, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.

CASTINGS (Wear Resisting)

Bethlehem Steel Co., Bethlehem, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hagan, George J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Haynes Stellite Co., 30 E. 42nd St., New York 17, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Mechanite Research Institute, Pershing Bldg., New Rochelle, N. Y.
Michiana Products Corp., Michigan City, Ind.
Mir-O-Col Alloy Co., 2416-30 E. 53rd St., Los Angeles 11, Cal.
National Alloy Steel Div., Blaw-Knox Co., Blawnox, Pa.
Ohio Steel Foundry Co., Lima & Springfield, O.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Saginaw Malleable Iron Div., General Motors Corp., Saginaw, Mich.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.
Taylor-Wharton Iron & Steel Co., Easton, Pa.

CASTINGS (Worm and Gear Bronze)

Ampco Metal Inc., Dept. S6 Milwaukee 4, Wis.
Cadman, A. W., Mfg. Co., 28th & Smallman Sts., Pittsburgh 22, Pa.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.

CEMENT (Acid Proof)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.

CEMENT (Elastic)

Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.

CEMENT (High Temperature)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Carborundum Co., The, Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Owens-Corning Fiberglass Corp., 1873 Nicholas Bldg., Toledo 1, O.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.

CEMENT (High Temperature Hydraulic)

Atlas Lumnite Cement Co., Dept. S, Chrysler Bldg., New York 17, N. Y.
Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.

CENTRAL STATION EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
General Electric Co., Schenectady 5, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

CHAIN (Conveyor and Elevator)

Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Cleveland Chain & Mfg. Co., The, Broadway & Henry Rd., Cleveland 5, O.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Union Chain & Mfg. Co., Sandusky, O.

CHAIN (Draw Bench)

Cleveland Chain & Mfg. Co., The, Broadway & Henry Rd., Cleveland 5, O.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Union Chain & Mfg. Co., Sandusky, O.

CHAIN (Malleable)

Cleveland Chain & Mfg. Co., The, Broadway & Henry Rd., Cleveland 5, O.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Lake City Malleable Co., The, 5026 Lakeside Ave., Cleveland 14, O.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.

CHAIN (Power Transmission)

Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Union Chain & Mfg. Co., Sandusky, O.

CHAIN (Roller)

Atlantic Gear Works, 200 Lafayette St., New York 12, N. Y.
Industrial Gear Mfg. Co., 4545 W. Van Buren St., Chicago 24, Ill.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.

CHAIN (Roller) (Con.)
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Union Chain & Mfg. Co., Sandusky, O.

CHAIN (Sling)
American Chain Div., American Chain & Cable Co., Inc., York, Pa.
Cleveland Chain & Mfg. Co., The, Broadway & Henry Rd., Cleveland 5, O.
Columbus-McKinnon Chain Corp., 118 Fremont Ave., Tonawanda, N. Y.
McKay Co., The, Pittsburgh 22, Pa.

CHAIN (Welded & Weldless)
American Chain Div., American Chain & Cable Co. Inc., York, Pa.
Cleveland Chain & Mfg. Co., The, Broadway & Henry Rd., Cleveland 5, O.
Columbus-McKinnon Chain Corp., 118 Fremont Ave., Tonawanda, N. Y.
McKay Co., The, Pittsburgh 22, Pa.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.

CHANNELS—See BEAMS, CHANNELS, ANGLES

CHARGING BOXES
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Union Steel Castings Div. of Blaw-Knox Co., 62nd & Butler Sts., Pittsburgh 1, Pa.

CHARGING MACHINES (Cupola)
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Morgan Engineering Co., The, Alliance, O.

CHARGING MACHINES (Open Hearth)
Brosius, Edgar E., Co., Sharpsburg P. O., Pittsburgh 15, Pa.
Morgan Engineering Co., The, Alliance, O.

CHECKER BRICK
Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.

CHECKS (Metal)
Cunningham, M. E., Co., 172 E. Carson St., Pittsburgh 19, Pa.
Grammes, L. F., & Sons, Inc., Allentown, Pa.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

CHEMICAL PROCESSING EQUIPMENT
Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Brandt, Charles T., Inc., 1702 Ridgely St., Baltimore 30, Md.
Hall, C. M., Lamp Co., 1005 E. Hancock St., Detroit 7, Mich.
Haynes Stellite Co., 30 E. 42nd St., New York 17, N. Y.
Struthers Wells Corp., Titusville, Pa.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

CHEMICALS (Industrial)
American Chemical Paint Co., Ambler, Pa.
General Chemical Co., 40 Rector St., New York 6, N. Y.
Hercules Powder Co., Inc., Wilmington 99, Del.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.
Wilkens-Anderson Co., 111 No. Canal St., Chicago 6, Ill.

CHEMICALS (Laboratory)
Baker & Adamson Div. General Chemical Co., 40 Rector St., New York 6, N. Y.

CHILLING EQUIPMENT (Metal)
Motor Products Corp., Deep Freeze Div., 2309-7 Davis St., N. Chicago, Ill.

CHROME MORTAR
Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Harbison-Walker Refractories Co. 1800 Farmers Bank Bldg. Pittsburgh 22, Pa.

CHROME ORE
Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

CHROMIUM METAL AND ALLOYS
Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.

CHROME PLATING (Porous)
Van Der Horst Corp. of America, 12500 Berea Rd., Cleveland 11, O.

CHROMIUM PLATING PROCESSES AND EQUIPMENT
United Chromium, Inc., 51 E. 42nd St., New York 17, N. Y.
Van Der Horst Corp. of America, 12500 Berea Rd., Cleveland 11, O.

CHUCK OPERATING CYLINDERS
Anker-Holth Mfg. Co., 2723 Connors St., Fort Huron, Mich.

CHUCKING MACHINES (Multiple Spindle)
Bullard Co., The, Bridgeport 2, Conn.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
New Britain Machine Co., New Britain, Conn.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O

CHUCKS
Apex Machine & Tool Co., 1025 S. Patterson Blvd., Dayton 7, O.
Bullard Co., The, Bridgeport 2, Conn.
Lee, K. O., Company, Aberdeen, S. Dak.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

CHUCKS (Automatic Closing)
Anker-Holth Mfg. Co., 2723 Connors St., Port Huron, Mich.

CLAMPS, CABLE (Sheet Metal)
Adel Precision Products Corp., 10345 Van Owen St., Burbank, Cal.
Tinnerman Products, Inc., 2039 Fulton Rd., Cleveland 13, O.

CLAMPS (Drop Forged)
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

CLAMPS (Pipe Repair)
Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.

CLAMPS (Plate Lifting)
Merrill Brothers, 56-04 Arnold Ave., Maspeth, N. Y.

CLAMPS (Toggle)
Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.

CLEANERS (Oil and Grease Absorbent)
Refiners Lubricating Co., 601 W. 26th St., New York 1, N. Y.
Waverly Petroleum Products Co., Drexel Bldg., Philadelphia 6, Pa

CLEANERS (Steam)
Homestead Valve Mfg. Co., P. O. Box 22, Coraopolis, Pa.
Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co., Dept. S, Pennsalt Cleaner Div., Philadelphia 7, Pa.

CLEANERS AND FILTERS (Air)
Adams, R. P., Co., Inc., 75 Chicago St., Buffalo 4, N. Y.
American Air Filter Co., Inc., 443 Central Ave., Louisville 8, Ky.
Moraine Products Div., General Motors Corp., Dayton 1, O.
Owens-Corning Fiberglass Corp., 1873 Nicholas Bldg., Toledo 1, O.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Westinghouse Electric Corp., 1216 W. 58th St., Cleveland 1, O.

CLEANING EQUIPMENT (Metal)
American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Bullard Co., The, Bridgeport 2, Conn.
Detrex Corporation, 13029 Hillview Ave., Detroit 4, Mich.
Gray-Mills Co., 1948-52 Ridge Ave., Evanston, Ill.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Meaker Co., The, 1635 S. 55th Ave., Chicago 50, Ill.
Pangborn Corporation, Hagerstown, Md.
Ransohoff, N., Inc., 1317 Township Ave., Cincinnati 16, O.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Wean Engineering Co., Inc., The, Warren, O.

CLEANING SPECIALTIES
American Chemical Paint Co., Ambler, Pa.
Detrex Corporation, 13029 Hillview Ave., Detroit 4, Mich.
Kondor Products Corp., West Clifton Blvd. at Sloane, Cleveland 7, O.
Oakite Products Inc., 30H Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co., Dept. S. Pennsalt Cleaner Div., Philadelphia 7, Pa.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.

CLUTCH DISCS
Burgess-Norton Mfg. Co., 778 Peyton St., Geneva, Ill.
Twin Disc Clutch Co., 1379 Racine Ave., Racine, Wis.

CLUTCH FACINGS
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

CLUTCHES (Friction)
Dodge Manufacturing Corp., Mishawaka, Ind.
Jones, W. A., Fdry. & Mach. Co., 4437 Roosevelt Rd., Chicago 24, Ill.
Link-Belt Co., 300 W. Pershing Road, Chicago 9, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Twin Disc Clutch Co., 1379 Racine Ave., Racine, Wis.

CLUTCHES (Magnetic)
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.

COAL OR COKE
Alan Wood Steel Co., Conshohocken, Pa.
Cleveland-Cliffs Iron Co., The, Union Commerce Bldg., Cleveland 14, O.
Hanna Furnace Corp., The, Penobscot Bldg., Detroit 26, Mich.
Koppers Co., Gas & Coke Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Koppers Coal Div., Eastern Gas & Fuel Assoc., 300 Koppers Bldg., Pittsburgh 19, Pa.
New England Coal & Coke Co., Boston 16, Mass.
Pickands Mather & Co., Union Commerce Bldg., Cleveland 14, O.
Shenango Furnace Co., Oliver Bldg., Pittsburgh 22, Pa.
Snyder, W. P., & Co., Oliver Bldg., Pittsburgh 22, Pa.

COAL, COKE, ORE, ASH HANDLING AND PROCESSING MACHINERY
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Bethlehem Steel Co., Bethlehem, Pa.
Easton Car & Construction Co., Easton, Pa.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Industrial Brownhoist Corp., Bay City, Mich.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Koppers Co., Engineering & Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Syntron Co., 370 Lexington Ave., Homer City, Pa.
Thew Shovel Co., The, Lorain, O.
Vulcan Iron Works, Wilkes-Barre, Pa.

COILERS (Strip & Wire)
Lewis Fdry & Mach. Div. of Blaw-Knox Co., Pittsburgh 30, Pa.

COILS (Direct Expansion)
General Electric Company (Air Conditioning & Commercial Refrigeration Div. Sec. 4412), Bloomfield, N. J.
Westinghouse Electric Corp., 653 Page Blvd., Springfield 2, Mass.

COILS (Electrical)
Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.

COILS (Water or Steam)
General Electric Company (Air Conditioning & Commercial Refrigeration Div. Sec. 4412), Bloomfield, N. J.
Westinghouse Electric Corp., 653 Page Blvd., Springfield 2, Mass.

COKE—See COAL or COKE

COKE OVEN MACHINERY
Alliance Machine Co., The Alliance, O.
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Koppers Co., Engineering & Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Morgan Engineering Co., The, Alliance, O.

COKE OVEN (By-Product)
Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

COLLET CHUCKS
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Universal Engineering Co., Frankenmuth, Mich.

COLLETS
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

COLUMBIUM
Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.

COMBUSTION BOATS
Carborundum Co., The, Niagara Falls, N. Y.
Norton Company, Worcester 6, Mass.

COMBUSTION CONTROLS
Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
Morgan Construction Co., Worcester 5, Mass.

COMPARATORS (Optical)
Jones & Lamson Machine Co., Springfield, Vt.

COMPENSATORS (Automatic)
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Westinghouse Electric Corp., Dept. 7N, E. Pittsburgh, Pa.

COMPOUNDS (Case Hardening, Heat Treating)

Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.

COMPOUNDS (Copper, Metal Finishing, Rust Removing, Rust Preventing)

American Chemical Paint Co., Ambler, Pa.
Kondor Products Corp., West Clifton Blvd. at Sloane, Cleveland 7, O.
Oakite Products Inc., 30H Thames St., New York 6, N. Y.
Rheem Research Products, Inc., 206 Standard Oil Bldg., Baltimore 2, Md.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.

COMPOUNDS (Drawing & Stamping)

Oakite Products Inc., 30H Thames St., New York 6, N. Y.

COMPOUNDS (Floor Cleaning)

Oakite Products Inc., 30H Thames St. New York 6, N. Y.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.

COMPRESSORS (Air)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Curtis Pneumatic Machinery Div. of Curtis Mfg. Co., 1996 Kienlen Ave., St. Louis 20, Mo.
DeLaval Steam Turbine Co., Trenton, N. J.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Jaeger Machine Co., The, 550 W. Spring St., Columbus 15, O.
Metallizing Co. of America, 1330 W. Congress St., Chicago 7, Ill.
Sturtevant, B. F. Co., Hyde Park, Boston 36, Mass.

CONCENTRATES, LUBRICATING OILS, GASOLINE

Hood Refining Co., N. Hamilton Ave., Greensburg, Pa.

CONCRETE (Heat Resistant)

Atlas Lumnite Cement Co., Dept. S, Chrysler Bldg., New York, 17, N. Y.
Babcock & Wilcox Co., Refractories Div., 85 Liberty St., New York, 6, N. Y.

CONCRETE REINFORCING BARS —See BARS (Concrete Reinforcing)

CONDENSERS (Evaporative)

Niagara Blower Co., Dept. S-54, 6 E. 45th St., New York 17, N. Y.

CONDENSERS (Surface, Barometric, Multi-Jet)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
General Electric Company (Air Conditioning & Commercial Refrigeration Div. Sec. 4412), Bloomfield, N. J.
Harrisburg Steel Corp., Harrisburg, Pa.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Ross Heater & Mfg. Co., Inc., 1431 West Ave., Buffalo 13, N. Y.
Westinghouse Electric Corp., 653 Page Blvd., Springfield 2, Mass.

CONDUITS (Asbestos Cement)

Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

CONDUITS (Electric)

Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.
General Electric Co., Schenectady 5, N. Y.
Steel and Tubes Div., Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

CONDUITS (Wood)

Koppers Co., Wood Preserving Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

CONNECTING RODS

Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.

CONTACTS & CONTACTORS (Electric)

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2693 E. 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.
Mallory, P. R. & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Ward Leonard Electric Company, 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

CONTAINERS (Shipping)

Morgan Lumber Sales Co., 8 East Long St., Columbus, O.
Rathborne, Hair & Ridgway Co., 1440 W. 21st Place, Chicago 8, Ill.

CONTRACT WORK

Atlas Metal Stamping Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Brandt, Charles T., Inc., 1702 Ridgely St., Baltimore 30, Md.
Bridgewater Screw Products Co., Bridgewater, Mass.
Burgess-Norton Mfg. Co., 778 Peyton St., Geneva, Ill.
Commercial Metals Treating Inc., 177 S. St. Clair St., Toledo 1, O.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
Gerding Bros., 5 E. Third St., Cincinnati 2, O.
Johnston & Jennings Co., The 877 Addison Rd., Cleveland 14, O.
Joyce Machine Co., 2080 Wheatsheaf Lane, Philadelphia 24, Pa.
Nilson, A. H., Machine Co., Inc. Bridgeport 5, Conn.
Steel Products Engineering Co., The 1205 W. Columbia St., Springfield, O.

CONTRACTORS—See ENGINEERS AND CONTRACTORS

CONTROL ASSEMBLIES (Remote Valve)

Zurn, J. A., Mfg. Co., Erie, Pa.

CONTROL EQUIPMENT (Electric)

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
Allis-Chalmers Mfg. Co., Milwaukee 11, Wis.
Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
General Electric Co., Schenectady 5, N. Y.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

CONTROL SYSTEMS (Automatic)

Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

CONTROL SYSTEMS (Office, Tool, Production, Materials)

Remington-Rand Inc., Systems Div., 415 Fourth Ave., New York 10, N. Y.

CONTROLS (Combustion)—See COMBUSTION CONTROLS

CONTROLS (Temperature)

Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

CONVEYING SYSTEMS (Steam Jet)

Hagan, George J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.

CONVEYOR BELTS

Manheim Mfg. & Belting Co. Manheim, Pa.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

CONVEYOR BELTS (High & Low Temperature)

Cyclone Fence Div., American Steel & Wire Co., Waukegan, Ill.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N.Y.

CONVEYOR BELTS (Wire)

Buffalo Wire Works Co., Inc., 437 Terrace Rd., Buffalo 2, N. Y.
Cyclone Fence Div., American Steel & Wire Co., Waukegan, Ill.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N.Y.

CONVEYORS (Apron)

Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Mathews Conveyer Co., Ellwood City, Pa.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Union Chain & Mfg. Co., Sandusky, O.

CONVEYORS (Belt)

Bartlett, C. O. & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Mathews Conveyer Co., Ellwood City, Pa.
Rapids Standard Co., Inc., The, Peoples Natl. Bank Bldg., Grand Rapids 2, Mich.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.

CONVEYORS (Chain)

Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Mathews Conveyer Co., Ellwood City, Pa.
Union Chain & Mfg. Co., Sandusky, O.
Vulcan Iron Works, Wilkes-Barre, Pa.

CONVEYORS (Drag)

Mathews Conveyer Co., Ellwood City, Pa.

CONVEYORS (Elevating)

Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Link-Belt Co., 300 W. Pershing Rd. Chicago 9, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Mathews Conveyer Co., Ellwood City, Pa.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.

CONVEYORS (Overhead)

Mathews Conveyer Co., Ellwood City, Pa.

CONVEYORS (Overhead Trolley)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Link-Belt Co., 2410 W. 18th St., Chicago 8, Ill.
Mathews Conveyer Co., Ellwood City, Pa.
Reading Chain & Block Corp., 2102 Adams St., Reading Pa.

CONVEYORS (Pneumatic)

Brandt, Charles T., Inc., 1702 Ridgely St., Baltimore 30, Md.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.

CONVEYORS (Portable)

Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Mathews Conveyer Co., Ellwood City, Pa.
Rapids Standard Co., Inc., The, Peoples Natl. Bank Bldg., Grand Rapids 2, Mich.

CONVEYORS (Roller—Power and Gravity)

Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.

CONVEYORS (Slat)

Mathews Conveyer Co., Ellwood City, Pa.
Union Chain & Mfg. Co., Sandusky, O.

CONVEYORS (Vibrating)

Ajax Flexible Coupling Co., 4 English St., Westfield, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Syntron Co., 370 Lexington Ave., Homer City, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.

CONVEYORS (Wheel—Gravity)

Rapids Standard Co., Inc., The Peoples Natl. Bank Bldg., Grand Rapids 2, Mich.

COOLANT SYSTEMS (Portable)

Gray-Mills Co., 1948-52 Ridge Ave., Evanston, Ill.

COOLERS (Liquid, Compressed Air, Gas)

Niagara Blower Co., Dept. S-54, 6 E. 45th St., New York 17, N. Y.
Ross Heater & Mfg. Co., Inc., 1431 West Ave., Buffalo 13, N. Y.

COPPER—See METALS (Nonferrous)

COPPER (Phosphorized)

Ajax Metal Co., Philadelphia 43, Pa.
American Brass Co., The, Waterbury 88, Conn.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Revere Copper & Brass, Inc. 230 Park Ave., New York 17, N.Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

CORE WASH

The United States Graphite Co., Saginaw, Mich.

COTTER PINS

American Chain Div., American Chain & Cable Co., Inc., York, Pa.
Hindley Mfg. Co., Valley Falls, R. I.
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.

COUNTERBORES

Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Haynes Stellite Co., 30 E. 42nd St., New York 17, N. Y.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

COUNTING DEVICES

Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Veeder-Root, Inc., Hartford 2, Conn.

COUPLINGS (Flexible)

Ajax Flexible Coupling Co., 4 English St., Westfield, N. Y.
American Flexible Coupling Div., J. A. Zurn Mfg. Co., 18th St. & Pittsburgh Ave., Erie, Pa.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Foote Bros. Gear & Machine Co., 5225 S. Western Blvd., Chicago 9, Ill.
General Electric Co., Schenectady 5, N. Y.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
James, D. O., Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Lovejoy Flexible Coupling Co., 4973 W. Lake St., Chicago 44, Ill.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Philadelphia Gear Works, Erie Ave. & G St., Philadelphia 34, Pa.
Poole Fdy. & Mach. Co., Woodberry, Baltimore 11, Md.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Union Chain & Mfg. Co., Sandusky, O.
Waldron, John, Corp., New Brunswick, N. J.
Westinghouse Electric Corp., 200 McCandless Ave., Pittsburgh 1, Pa.

COUPLINGS (Hose)

Cleveland Pneumatic Tool Co., The, 3781 E. 77th St., Cleveland 5, O.
Goodrich, B. F., Co., The, Akron 19, O.
Hansen Manufacturing Co., The, 1786 E. 27th St., Cleveland 14, O.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y
Kelly Machinery Co., 2524 W. Madison St., Chicago 12, Ill.

COUPLINGS (Pipe)

Bethlehem Steel Co., Bethlehem, Pa.
Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.
Harrisburg Steel Corp., Harrisburg, Pa.
National Tube Co. Frick Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept ST, Cleveland 4, O.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

COVERS (Wire)

Buffalo Wire Works Co., Inc., 437 Terrace Rd., Buffalo 2, N. Y.

CRADLES (Coil)

Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13, Ill.

CRANES (Charging)

Alliance Machine Co., The Alliance, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Morgan Engineering Co., The, Alliance, O.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

CRANES (Electric)

Alliance Machine Co., The, Alliance, O.
American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Bedford Foundry & Mach. Co., Bedford, Ind.
Browning, Victor R., Co., Inc., Willoughby, O.
Chicago Tramrail Co., 2912 W. Carroll Ave., Chicago 12, Ill.
Chisholm-Moore Hoist Corp., 118 Fremont Ave., Tonawanda, N. Y.
Cleveland Crane & Engineering Co., The, 1125 E. 283rd St., Wickliffe, O.
Erie Steel Construction Co., Erie, Pa.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis
Morgan Engineering Co., The, Alliance, O.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.
Thew Shovel Co., The, Lorain, O.

CRANES (Gantry)

Alliance Machine Co., The Alliance, O.
American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Bedford Foundry & Mach. Co., Bedford, Ind.
Browning, Victor R., Co., Inc., Willoughby, O.
Cleveland Crane & Engineering Co., The, 1125 E. 283rd St., Wickliffe, O.
Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Morgan Engineering Co., The, Alliance, O.
Northwest Engineering Co., 28 E. Jackson Blvd., Chicago 4, Ill.
Ohio Locomotive Crane Co., Bucyrus, O.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.
Thew Shovel Co., The, Lorain, O.

CRANES (Gasoline and Diesel)

Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Jaeger Machine Co., The, 550 W. Spring St., Columbus 15, O.
Northwest Engineering Co., 28 E. Jackson Blvd., Chicago 4, Ill.
Ohio Locomotive Crane Co., Bucyrus, O.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20 N. Y.
Thew Shovel Co., The, Lorain, O.

CRANES (Hand)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Bedford Foundry & Mach. Co., Bedford, Ind.
Chicago Tramrail Co., 2912 W. Carroll Ave., Chicago 12, Ill.
Chisholm-Moore Hoist Corp., 118 Fremont Ave., Tonawanda, N. Y.
Cleveland Crane & Engineering Co., The, 1125 E. 283rd St., Wickliffe, O.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Curtiss Pneumatic Machinery Div. of Curtiss Mfg. Co., 1996 Kienlen Ave., St. Louis 20, Mo.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Industrial Brownhoist Corp., Bay City, Mich.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.
Wright Mfg. Div. of American Chain & Cable Co., Inc., York, Pa.

CRANES (Jib)

Alliance Machine Co., The Alliance, O.
American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Bedford Foundry & Mach. Co., Bedford, Ind.
Chicago Tramrail Co., 2912 W. Carroll Ave., Chicago 12, Ill.
Chisholm-Moore Hoist Corp., 118 Fremont Ave., Tonawanda, N. Y.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis
Industrial Brownhoist Corp., Bay City, Mich.
Link-Belt Speeder Corp., 301 W. Pershing Rd., Chicago 9, Ill.
Morgan Engineering Co., The, Alliance, O.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Thew Shovel Co., The Lorain, O.
Wright Mfg. Div. of American Chain & Cable Co., Inc., York, Pa.

CRANES (Locomotive)

Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Northwest Engineering Co., 28 E. Jackson Blvd., Chicago 4, Ill.
Ohio Locomotive Crane Co., Bucyrus, O.
Osgood Co., The, Marion, O.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y

CRANES (Monorail)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Chicago Tramrail Co., 2912 W. Carroll Ave., Chicago 12, Ill.
Chisholm-Moore Hoist Corp., 118 Fremont Ave., Tonawanda, N. Y.
Cleveland Crane & Engineering Co., The, 1125 E. 283rd St., Wickliffe, O.
Euclid Crane & Hoist Co., The 1365 Chardon Rd., Euclid, O.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

CRANES (Portable Electric)

Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.

CRANES (Self-propelled)

Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Hughes-Keenan Co., 585 Newman St., Mansfield, O.
Industrial Brownhoist Corp., Bay City, Mich.
Link-Belt Speeder Corp., 301 W. Pershing Rd., Chicago 9, Ill.
Northwest Engineering Co., 28 E. Jackson Blvd., Chicago 4, Ill.
Ohio Locomotive Crane Co., Bucyrus, O.
Osgood Co., The, Marion, O.
Thew Shovel Co., The, Lorain, O.

CRANES (Traveling)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Bedford Foundry & Mach. Co., Bedford, Ind.
Chicago Tramrail Co., 2912 W. Carroll Ave., Chicago 12, Ill.
Chisholm-Moore Hoist Corp., 118 Fremont Ave., Tonawanda, N. Y.
Erie Steel Construction Co., Erie, Pa.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Wright Mfg. Div. of American Chain & Cable Co., Inc., York, Pa.

CRANES, BRIDGE (Ore and Coal Handling)

Alliance Machine Co., The Alliance, O.
Browning, Victor R., Co., Inc., Willoughby, O.
Industrial Brownhoist Corp., Bay City, Mich.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.

CRANKSHAFTS

Bay City Forge Co., W. 19th and Cranberry Sts., Erie, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Canton Drop Forging & Mfg. Co., The, Canton, O.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Ladish Drop Forge Co., Cudahy, Wis.
Midvale Co., The Nicetown, Philadelphia 40, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Ohio Crankshaft Co., The, 3800 Harvard Ave., Cleveland 1, O.
Union Drawn Steel Div., Republic Steel Corp., Massillon, O.

CRATING (Wood)

Morgan Lumber Sales Co., 8 E. Long St., Columbus, O.

CRAYONS (Metal Marking)

American Crayon Co., Sandusky, O.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

CRUSHERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Pulverizer Co., 1539 Macklind Ave., St. Louis 10, Mo.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Gruendler Crusher & Pulverizer Co., 2915-17 N. Market St., St. Louis 6, Mo.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Mahr Mfg. Co., Div of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Vulcan Iron Works, Wilkes-Barre, Pa.

CUSHIONS (Pneumatic)

Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.

CUTTERS (Bar and Bar Products)

Bokum Tool Co., 14775 Wildermere Ave., Detroit 21, Mich.
Lewthwaite, T. H., Machine Co., Inc., 311 E. 47th St., New York 17, N. Y.
Porter, H. K., Inc., 401 Ashland St., Everett, Mass.

CUTTERS (Die Sinking & End Milling)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Clark, Robert H., Co., 9330 Santa Monica Blvd., Beverly Hills, Cal.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Tomkins-Johnson Co., The, Dept. S, 611 N. Mechanic St., Jackson, Mich.
Tung-Tip Tools Div., Lowell & Grayson, Monrovia, Cal.

CUTTERS (Gear Shaper)

Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.

CUTTERS (Herringbone Gear)

Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.

CUTTERS (Thread Milling)

Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Plan-O-Mill Corp., 1511 E. Eight Mile Rd., Hazel Park, Mich.

CUTTERS (Wire and Cable)

Lewthwaite, T. H., Machine Co., Inc., 311 E. 47th St., New York 17, N. Y.
Porter, H. K., Inc., 401 Ashland St., Everett, Mass.

CUTTING AND WELDING—
See WELDING

CUTTING OILS—
See OILS (Cutting)

CUTTING-OFF MACHINES (Abrasive)

Bridgeport Safety Emery Wheel Co., Inc., The, P. O. Box 2031 Stratford, Bridgeport, Conn.
Campbell, Andrew C., Div., American Chain & Cable Co., Inc., Bridgeport 2, Conn.
Delta Mfg. Co., The, 708N E. Vienna Ave., Milwaukee 1, Wis.
deSanno, A. P., & Son Inc., 436 Wheatland St., Phoenixville, Pa.
Landis Machine Co., Waynesboro, Pa.

CUTTING-OFF MACHINES (Rotary)

Consolidated Machine Tool Corp. 565 Blossom Rd., Rochester 10, N. Y.
Pines Engineering Co., 600 Prairie St., Aurora, Ill.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

CYANIDING

Commercial Metals Treating, Inc. 177 S. St. Clair St., Toledo 1, O
Lakeside Steel Improvement Co., The, 5418 Lakeside Ave., Cleveland 14, O.
Pittsburgh Commercial Heat Treating Co., 49th St., & A.V.R.R., Pittsburgh 1, Pa.
U. S. Automatic Corp., Amherst, O.

CYLINDERS (Air or Hydraulic)

Curtis Pneumatic Machinery Div. of Curtis Mfg. Co., 1996 Kienlen Ave., St. Louis 20, Mo.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Scaife Co., Ann St., Oakmont, Pa.
Tomkins-Johnson Co., The, Dept. S, 611 N. Mechanic St., Jackson, Mich.
Weatherhead Co., The, 300 E. 131st St., Cleveland 8, O

CYLINDERS (Pressure)

Bethlehem Steel Co., Bethlehem, Pa.
Harrisburg Steel Corp., Harrisburg, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Midvale Co., The. Nicetown, Philadelphia 40, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Scaife Co., Ann St., Oakmont, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.

DEGREASERS

American Chemical Paint Co., Ambler, Pa.
Detrex Corporation, 13029 Hillview Ave., Detroit 4, Mich.
Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co. Dept. S, Pennsalt Cleaner Div., Philadelphia 7, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.

DEODORANT (Plant Sanitation)

Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.

DEOXIDIZERS

Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.

DERRICKS (Steel Stiffleg, Barge or Guy)

Bedford Foundry & Machine Co., Bedford, Ind.

DESCALING PROCESSES AND EQUIPMENT

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Ajax Electric Co., Inc., 911 Frankford Ave., Philadelphia 23, Pa.
American Chemical Paint Co., Ambler, Pa.
American Foundry Equipment Co. 509 S. Byrkit St., Mishawaka, Ind.
Bullard Co., The, Bridgeport 2, Conn.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.

DESIGNERS (Product)

Atlas Tool & Designing Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.

DIAMOND POWDER

Industrial Abrasives, Inc., 3724 W. 38th St., Dept. 3-N, Chicago 32, Ill.

DIAMOND WHEELS

Industrial Abrasives, Inc., 3724 W. 38th St., Dept. 3-N, Chicago 32, Ill.
Norton Co., Worcester 6, Mass.

DIAMONDS (Wheel Dressing)

Diamond Tool Co., 933 E. 41st St., Chicago 15, Ill.

DIE BLOCKS

Advance Foundry Co., The, 100 Parnell Ave., Dayton 3, O.
American Shear Knife Co., P.O. Box 355, Homestead, Pa
Ampco Metal Inc., Dept S6 Milwaukee 4, Wis.
Bissett Steel Co., The, 945 E. 67th St., Cleveland 8, O.
Finkl, A., & Sons Co., 2011 N. Southport Ave., Chicago 14, Ill.
Firth-Sterling Steel Company, McKeesport, Pa.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Holliday, W. J., & Co., Hammond, Ind.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Jessop Steel Co., 584 Green St., Washington, Pa.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Standard Steel Works Div. of The Baldwin Locomotive Works. Philadelphia 42, Pa.

DIE CASTINGS (Aluminum, Magnesium, Zinc)

Advance Pressure Castings Inc., 42 N. 15th St., Brooklyn 22, N. Y.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Stewart-Warner Corp., Stewart Die Casting Div., 1828 W. Diversey Blvd., Chicago 14, Ill.

DIE CENTERS

Firth-Sterling Steel Company, McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Vascoloy-Ramet Corp., N. Chicago, Ill.

DIE HEADS

Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Jones & Lamson Machine Co., Springfield, Vt.
Landis Machine Co., Waynesboro, Pa.
Murchey Machine & Tool Co., 951 Porter St., Dept. L, Detroit 26, Mich.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.

DIE SETS

Advance Foundry Co., The, 100 Parnell Ave., Dayton 3, O.
Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.

DIE-SINKING MACHINES

Cincinnati Milling Machine Co., Cincinnati 9, O.

DIES (Forging)—See FORGING DIES

DIES (Notching)

Algoma Products Co., 3080 E. Outer Dr., Detroit 12, Mich.
Lewthwaite, T. H., Machine Co., Inc., 311 E. 47th St., New York 17, N. Y.
Wales Strippit Corp., 385 Payne Ave., N. Tonawanda, N. Y.

DIES (Perforating)

Algoma Products Co., 3080 E. Outer Dr., Detroit 12, Mich.
Lewthwaite, T. H., Machine Co., Inc., 311 E. 47th St., New York 17, N. Y.
Wales Strippit Corp., 385 Payne Ave., N. Tonawanda, N. Y.

DIES (Punching, Stamping, Blanking)

Ace Mfg. Corp., 1211 East Erie Ave., Philadelphia 24, Pa.
Acme Aluminum Alloys Inc., 232 Findlay St., Dayton 3, O.
Advance Foundry Co., The, 100 Parnell Ave., Dayton 3, O.
Algoma Products Co., 3080 E. Outer Dr., Detroit 12, Mich.
Firth-Sterling Steel Company, McKeesport, Pa.
Lewthwaite, T. H., Machine Co., Inc., 311 E. 47th St., New York 17, N. Y.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
Vascoloy-Ramet Corp., N. Chicago, Ill.
Wales Strippit Corp., 385 Payne Ave., N. Tonawanda, N. Y.
Zeh & Hahnemann Co., 56 Avenue A, Newark 5, N. J.

DIES (Steel, Embossing)

Cunningham, M. E., Co., 172 E. Carson St., Pittsburgh 19, Pa.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

DIES (Trimming)

Bliss, E. W., Co., 53rd & Second Ave., Brooklyn 32, N. Y.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Steel Products Engineering Co., The, 1205 W. Columbia St., Springfield, O.

DIES AND CHASERS (Threading)

Landis Machine Co., Waynesboro, Pa.

DIFFERENTIALS

Fairfield Manufacturing Co., 303 S. Earl Ave., Lafayette, Ind.

DIPPERS (Rubber)

Goodrich, B. F., Co., The, Akron 19, O.

DIPPING MACHINES (Monorail)

American MonoRail Co., The, 13102 Athens Ave., Cleveland, O.
Cleveland Crane & Engineering Co., The, 1125 E. 283rd St., Wickliffe, O.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

DISCS (Abrasive)

Abrasive Products Inc., 511 Pearl St., S. Braintree, Mass.
Carborundum Co., The, Niagara Falls, N. Y.
Chicago Wheel & Manufacturing Co. Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd. Chicago 6, Ill.
Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.
Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.
Norton Co., Worcester 6, Mass.

DOLOMITE—FLUX AND REFRACTORIES

Baker, The J. E., Co., 114 N. George St., York, Pa.
Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.

DOORS & SHUTTERS (Steel, Wood Rolling—Service, Fire)

Kinnear Mfg. Co., The, 1780-1800 Fields Ave., Columbus 16, O.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.

DOWEL PINS (Steel)

Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.

DRAFT GAGES (Indicating, Recording)

Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.

DRAGLINES (Crawler)

Northwest Engineering Co., 28 E. Jackson Blvd., Chicago 4, Ill.
Thew Shovel Co., The, Lorain, O.

DRAINS (Roof, Floor & Area)

Zurn, J. A., Mfg. Co., Erie, Pa.

DRAW BENCHES

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
McKay Machine Co., The, Youngstown 2, O.
Vaughn Machinery Co., Cuyahoga Falls, O.

DRESSERS (Grinding Wheel)

Carborundum Co., The, Niagara Falls, N. Y.
Chicago Wheel & Manufacturing Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Diamond Tool Co., 933 E. 41st St., Chicago 15, Ill.
Lee, K. O., Company, Aberdeen, S. Dak.
Safety Grinding Wheel & Machine Co., P. O. Box 746, Springfield, O.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.
Vinco Corp., Schaefer and Joy Rds., Detroit 27, Mich.

DRILL HEADS

Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Snyder Tool & Engineering Co., 3400 W. Lafayette Ave., Detroit 7, Mich.

DRILL RODS—See RODS (Drill)

DRILLING MACHINERY

Baker Bros., Inc., Post & Westlake Sts., Toledo 10, O.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Cross Co., The 3250 Bellevue Ave., Detroit 7, Mich.
Delta Mfg. Co., The, 703N E. Vienna Ave., Milwaukee 1, Wis.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.

DRILLING MACHINES (Horizontal)

Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.

DRILLING MACHINES (Radial)

Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

DRILLING MACHINES (Vertical)

Baker Bros., Inc., Post & Westlake Sts., Toledo 10, O.
Bryant Machinery & Engineering Co., 400 W. Madison St., Chicago 6, Ill.
Cleereman Machine Tool Co., Green Bay, Wis.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Delta Mfg. Co., The, 703N E. Vienna Ave., Milwaukee 1, Wis.
Haskins, R. G., Co., 615 California Ave., Chicago 12, Ill.
Moline Tool Co., 102 20th St., Moline, Ill.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

DRILLS (Electric Portable)

Chicago Wheel & Manufacturing Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.
Mid-States Equipment Co., Welding Div., 2425 S. Michigan Ave., Chicago 16, Ill.
Syntron Co., 370 Lexington Ave., Homer City, Pa.

DRILLS (For Hardening Steels)

Black Drill Co., 1400 E. 222nd St., Cleveland 17, O.

DRILLS (Pneumatic)

Cleveland Pneumatic Tool Co., The, 3781 E. 77th St., Cleveland 5, O.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

DRILLS (Twist)—See TWIST DRILLS

DRIVES (Chain)

Atlantic Gear Works, 200 Lafayette St., New York 12, N. Y.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.
Union Chain & Mfg. Co., Sandusky, O.

DRIVES (Cut Herringbone Gear)

Atlantic Gear Works, 200 Lafayette St., New York 12, N. Y.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Foote Bros. Gear & Machine Co., 5225 S. Western Blvd., Chicago 9, Ill.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
James, D. O., Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Link-Belt Co., 2045 W. Hunting Park Ave., Philadelphia 40, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Philadelphia Gear Works, Erie Ave. & G Sts., Philadelphia 34, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Westinghouse Electric Corp., 200 McCandless Ave., Pittsburgh 1, Pa.

DRIVES (Hydraulic)

Twin Disc Clutch Co., 1379 Racine Ave., Racine, Wis.

DRIVES (Multi-V-Belt)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Dodge Manufacturing Corp., Mishawaka, Ind.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.

DRUMS (Steel)

Protectoseal Co., 1920 S. Western Ave., Chicago 8, Ill.
Rheem Research Products, Inc., 206 Standard Oil Bldg., Baltimore 2, Md.

DRY CLEANING EQUIPMENT

Detrex Corporation, 13029 Hillview Ave., Detroit 4, Mich.

DRYERS (Compressed Air)

Ruemelin Mfg. Co., 3882 N. Palmer St., Milwaukee 12, Wis.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.

DRYERS (Paint, Varnish, Enamel, Chemical)

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Fostoria Pressed Steel Corp., The, Fostoria, O.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Hall, C. M., Lamp Co., 1005 E. Hancock St., Detroit 7, Mich.
Maehler, Paul, Co., The, 2208 W. Lake St., Chicago 12, Ill.
Mahon, The R. C., Co., 8650 Mt. Elliott Ave., Detroit 11, Mich.
Struthers Wells Corp., Titusville, Pa
Wagner Litho Machinery Co., Hoboken, N. J.

DRYERS AND COOLERS (Rotary)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bartlett, C. O., & Snow Co., The 6200 Harvard Ave., Cleveland 5, O.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Vulcan Iron Works, Wilkes-Barre, Pa.

DUCTS (Acid Fume, Rubber Lined)

Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

DUPLICATING EQUIPMENT

American Photocopy Equipment Co., 2849 N. Clark St., Chicago 14, Ill.
Ozalid Products Div., General Aniline & Film Corp., Johnson City, N. Y.

DUST ARRESTING EQUIPMENT

American Air Filter Co., Inc., 443 Central Ave., Louisville 8, Ky.
American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Brandt, Charles T., Inc., 1702 Ridgely St., Baltimore 30, Md.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Owens-Corning Fiberglass Corp., 1873 Nicholas Bldg., Toledo 1, O.
Pangborn Corporation, Hagerstown, Md.
Ruemelin Mfg. Co., 3882 N. Palmer St., Milwaukee 12, Wis.
Schneible, Claude B., Co., 2827 25th St., Detroit 16, Mich.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Westinghouse Electric Corp., 1216 W. 58th St., Cleveland 1, O.

ECONOMIZERS

Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.

ELECTRICAL EQUIPMENT

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.
Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
DuMont, Allen B., Laboratories, Inc., 2 Main Ave., Passaic, N. J.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
Fostoria Pressed Steel Corp., The, Fostoria, O.
General Electric Co., Schenectady 5, N. Y.
Master Electric Co., The, 100 Davis Ave., Dayton 1, O.
Square D Co., 6060 Rivard St., Detroit 11, Mich.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

ELECTRODES (Alloy) (*Also Stainless)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
*Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
*Alloy Rods Co., York, Pa.
American Agile Corp., 5800 Hough Ave., Cleveland 3, O.
Arcos Corp., 318 Gulf Bldg., Philadelphia 8, Pa.
*Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y.
*General Electric Co., Schenectady 5, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
McKay Co., The, Pittsburgh 22, Pa.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

ELECTRODES (Carbon and Graphite)

National Carbon Co., Inc., Electrode Sales Div., 30 E. 42nd St., New York 17, N. Y.

ELECTRODES (Hard Surfacing Welding)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
American Agile Corp., 5800 Hough Ave., Cleveland 3, O.
Arcos Corp., 318 Gulf Bldg., Philadelphia 8, Pa.
General Electric Co., Schenectady 5, N. Y.
Lee, K. O., Company, Aberdeen, S. Dak.
Lincoln Electric Co., The, Cleveland 1, O.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Mir-O-Col Alloy Co., 2416-30 E. 53rd St., Los Angeles 11, Cal.
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

ELECTRODES (Resistance Welding)

Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

ELEVATING AND CONVEYING MACHINERY—See CONVEYORS

ELEVATORS

Otis Elevator Co., 260 11th Ave., New York 1, N. Y.

ENGINEERS (Consulting)

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Associated Engineers, Inc., 230 E. Berry St., Fort Wayne 2, Ind.
Atlas Tool & Designing Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Easton Car & Construction Co., Easton, Pa.
Garrett, George K., Co., 1421 Chestnut St., Philadelphia 2, Pa.
Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.
Rheem Research Products, Inc., 206 Standard Oil Bldg., Baltimore 2, Md.
Trundle Engineering Co., The, 1501 Euclid Ave., Cleveland 15, O.
Vinco Corp., Schaefer and Joy Rds., Detroit 27, Mich.

ENGINEERS (Management)

Associated Engineers, Inc., 230 E. Berry St., Fort Wayne 2, Ind.
Trundle Engineering Co., The, 1501 Euclid Ave., Cleveland 15, O.

ENGINEERS AND CONTRACTORS

Associated Engineers, Inc., 230 E. Berry St., Fort Wayne 2, Ind.
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Brandt, Charles T., Inc., 1702 Ridgely St., Baltimore 30, Md.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Morgan Engineering Co., The, Alliance, O.
Wean Engineering Co. Inc., The, Warren, O.

ENGINES (Diesel)

Cooper-Bessemer Corp., The, Mt. Vernon, O.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

ENGINES (Gas, Oil)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Ingersoll-Rand Co., 11 Broadway New York 4, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Wisconsin Motor Corp., 1910 S. 53rd St., Milwaukee 14, Wis.

ENGINES (Kerosene)

Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.

ENGINES (Steam)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Oil Well Supply Co., Dallas 1, Tex.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Vulcan Iron Works, Wilkes-Barre, Pa.

EVAPORATORS

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Struthers Wells Corp., Titusville, Pa

EXCAVATORS

Northwest Engineering Co., 28 E. Jackson Blvd., Chicago 4, Ill.
Osgood Co., The, Marion, O.
Thew Shovel Co., The, Lorain, O.

EXHAUST HEADS

Burt Mfg. Company, The, 400 S. High St., Akron 11, O.

EXHAUST SYSTEMS (Pickling Tank)

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
DeBothezat Fans, Div. American Machine & Metals Co., East Moline, Ill.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.

FABRICATING (Metal)

Mahon, R. C., Co., The 8650 Mt. Elliott Ave., Detroit 11, Mich.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.
Stanwood Corp., 4825 W. Cortland St., Chicago 39, Ill.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

FABRICATORS (Structural)

Bedford Foundry & Mach. Co., Bedford, Ind.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.
Duffin Iron Company, 37 W. Van Buren St., Chicago 5, Ill.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

FACE SHIELDS

Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

FANS (Crane Cab)

Perkins, B. F., & Son, Inc., Holyoke, Mass.

FANS (Exhaust Ventilating)

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
DeBothezat Fans, Div. American Machine & Metals Co., East Moline, Ill.
General Electric Co., Sec. A-443-90 Tungar & Metallic Rectifier Div., Bridgeport 2, Conn.
Guyan Machinery Co., Logan, W. Va.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.

FANS (Mechanical Draft)

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
DeBothezat Fans, Div. American Machine & Metals Co., East Moline, Ill.
Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.

FANS (Portable)

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
DeBothezat Fans, Div. American Machine & Metals Co., East Moline, Ill.
Perkins, B. F., & Son, Inc., Holyoke, Mass.

FANS (Wall)

Perkins, B. F., & Son, Inc., Holyoke, Mass.

FASTENERS (Locked In)

Bardwell & McAlister, Inc., P. O. Box 1310, Hollywood 28, Cal.

FEEDERS (Rotary)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.

FEEDS (Roll, Dial, Magazine)

Bliss, E. W., Co., 53rd St. & Second Ave., Brooklyn 32, N. Y.
Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13, Ill.

FENCE (Chain Link)

Continental Steel Corp., Kokomo, Ind.
Cyclone Fence Div., American Steel & Wire Co., Waukegan, Ill.
Lavinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Page Steel & Wire Div. American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.

FENCE POSTS (Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.

FENCING (Wire)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco 6, Cal.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
Page Steel & Wire Div. American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST., Cleveland 4, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.

FERROALLOY BRIQUETS

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.

FERROALLOYS

Cleveland-Cliffs Iron Co., The, Union Commerce Bldg., Cleveland 14, O.
Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Mir-O-Col Alloy Co., 2416-30 E. 53rd St., Los Angeles 11, Cal.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.

FERROBORON

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Molybdenum Corp. of America, Grant Bldg., Pittsburgh 19, Pa.

FERROCOLUMBIUM

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.

FERROCHROME

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

FERROMANGANESE

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

FERROMOLYBDENUM

Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
Molybdenum Corp. of America, Grant Bldg., Pittsburgh 19, Pa.

FERROPHOSPHORUS

Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

FERROSILICON

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.
Southern Ferro Alloys Co., 2108 Chestnut St., Chattanooga 2, Tenn.
Westinghouse Electric Corp., Dept. 7N, E. Pittsburgh, Pa.

FERROTITANIUM

Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.

FERROTUNGSTEN

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Molybdenum Corp. of America, Grant Bldg., Pittsburgh 19, Pa.

FERROVANADIUM

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

FILES AND RASPS

Disston, Henry, & Sons, Inc., 626 Tacony, Philadelphia 35, Pa.
Haskins, R. G. Co., 615 California Ave., Chicago 12, Ill.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.

FILES (Band-Metal)

DoAll Co., The, 231 N. Laurel Ave., Des Plaines, Ill.

FILTER MEDIA

Moraine Products Div., General Motors Corp., Dayton 1, O.

FILTERS (Air)—See CLEANERS AND FILTERS (Air)

FILTERS (Acid)

Adams, R. P., Co., Inc., 75 Chicago St., Buffalo 4, N. Y.

FILTERS (Air-Engine)

American Air Filter Co., Inc., 443 Central Ave., Louisville 8, Ky.
Donaldson Co. Inc., 666 Pelham St., St. Paul 4, Minn.

FILTERS (Oil)

Burt Mfg. Company, The, 400 S. High St., Akron 11, O.

FINISH, BLACK OXIDE (Chemicals for)

Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.

FINISHING EQUIPMENT (Painting, and Drying)

Fostoria Pressed Steel Corp., The, Fostoria, O.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.

FIRE BRICK—See BRICK

FIRE BRICK (Insulating)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

FIRE CLAY —See REFRACTORIES

FIRE DOORS & SHUTTERS—See DOORS & SHUTTERS

FIRE EXTINGUISHERS

Cardox Corp., Bell Bldg., Chicago 1, Ill.
Kidde, Walter, & Co., Inc., 140 Cedar St., New York 6, N. Y.

FIRE EXTINGUISHING SYSTEMS

Cardox Corp., Bell Bldg., Chicago 1, Ill.
Kidde, Walter, & Co., Inc., 140 Cedar St., New York 6, N. Y.

FITTINGS (Acid Proof)

Goodrich, B. F., Co., The, Akron 19, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

FITTINGS (Drainage)

Zurn, J. A., Mfg. Co., Erie, Pa.

FITTINGS (Malleable and Cast Iron)

Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.

FITTINGS (Pipe Welding)

Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.

FLAME HARDENING

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
American Welding & Mfg. Co., The, Warren, O.
Commercial Metals Treating, Inc., 177 S. St. Clair St., Toledo 1, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Lakeside Steel Improvement Co., The, 5418 Lakeside Ave., Cleveland 14, O.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

FLANGES (Cast Steel)

Commercial Metals Treating, Inc., 177 S. St. Clair St., Toledo 1, O.
Pittsburgh Steel Foundry Corp., Glassport, Pa.

FLANGES (Forged Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Commercial Metals Treating, Inc., 177 S. St. Clair St., Toledo 1, O.
Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Harrisburg Steel Corp., Harrisburg, Pa.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Ladish Drop Forge Co., Cudahy, Wis.
Phoenix Manufacturing Co., 332 S. Michigan Ave., Chicago 4, Ill.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.

FLANGES (Welded Steel)

Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.

FLEXIBLE SHAFT MACHINERY

Haskins, R. G., Co., 615 California Ave., Chicago 12, Ill.
Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.
Wyzenbeek & Staff Inc., 838 W. Hubbard St., Chicago 22, Ill.

FLOORING (Monolithic)

Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

FLOORING (Steel)

Alan Wood Steel Co., Conshohocken, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tri-Lok Co., 5515 Butler St., Pittsburgh 1, Pa.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.

FLUE DUST CONDITIONERS

Brosius, Edgar E. Co., Sharpsburg P. O., Pittsburgh 15, Pa.

FLUE GAS ANALYZERS

Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.

FLUORSPAR

Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.

FLUXES (Brazing)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

FLUXES (Soldering, Welding & Tinning)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Chemical Paint Co., Ambler, Pa.
Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
Johnson, Lloyd S., Co., 2241 S. Indiana Ave., Chicago 16, Ill.
Kester Solder Co., 4222 Wrightwood Ave., Chicago 39, Ill.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Metallizing Co. of America, 1330 W. Congress St., Chicago 7, Ill.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

FOIL (Electrical Condenser)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

FORGING DIES

Finkl, A., & Sons Co., 2011 N. Southport Ave., Chicago 14, Ill.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Phoenix Manufacturing Co., 332 S. Michigan Ave., Chicago 4, Ill.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.

FORGING MACHINERY

Alliance Machine Co., The, Alliance, O.
Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Erie Foundry Co., Erie, Pa.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.

FORGING MACHINERY (Con.)

Industrial Brownhoist Corp., Bay City, Mich.
Morgan Engineering Co., The, Alliance, O.
National Machinery Co., The, Tiffin, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.

FORGINGS (Aluminum, Magnesium, Brass, Bronze, Copper)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Brass Co., The, Waterbury 88, Conn.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Ampco Metal Inc., Dept. S6, Milwaukee 4, Wis.
Bison Forge Co., 119 Manitoba St., Buffalo 6, N. Y.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Canton Drop Forging & Mfg. Co., The, Canton 2, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Titan Metal Mfg. Co., Bellefonte, Pa.
Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7. N. Y.
Wyman-Gordon Products Corp., Worcester, Mass.

FORGINGS (Drop) (*Also Stainless)

*Aircraft Mechanics, Inc., Nevada St., Colorado Springs, Colo.
*Atlas Drop Forge Co., Lansing 2, Mich.
*Bethlehem Steel Co., Bethlehem, Pa
*Canton Drop Forging & Mfg. Co., The, Canton 2, O.
Davenport-Besler Corp., Davenport, Iowa.
Frost Gear and Forge Div., Clark Equipment Co., Jackson, Mich.
Harrisburg Steel Corp., Harrisburg, Pa.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Ladish Drop Forge Co., Cudahy, Wis.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Phoenix Manufacturing Co., 332 S. Michigan Ave., Chicago 4, Ill.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.
Wyman-Gordon Products Corp., Worcester, Mass.

FORGINGS (Hollow Bored)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Atlas Drop Forge Co., Lansing 2, Mich.
Bay City Forge Co., W. 19th and Cranberry Sts., Erie, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Canton Drop Forging & Mfg. Co., The, Canton 2, O.
Commercial Forgings Co., The, 3700 E. 91st St., Cleveland 5, O.
Dresser Manufacturing Div. Dresser Industries, Bradford, Pa.
Finkl, A., & Sons Co., 2011 N. Southport Ave., Chicago 14, Ill.
Harrisburg Steel Corp., Harrisburg, Pa.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Phoenix Manufacturing Co., 332 S. Michigan Ave., Chicago 4, Ill.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Wyman-Gordon Products Corp., Worcester, Mass.

FORGINGS (Iron and Steel) (*Also Stainless)

*Aircraft Mechanics, Inc., Nevada St., Colorado Springs, Colo.
*Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
*Atlas Drop Forge Co., Lansing 2, Mich.
Bay City Forge Co., W. 19th and Cranberry Sts., Erie, Pa.
*Bethlehem Steel Co., Bethlehem, Pa.
Bison Forge Co., 119 Manitoba St., Buffalo 6, N. Y.
*Canton Drop Forging & Mfg. Co., The, Canton 2, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Commercial Forgings Co., The, 3700 E. 91st St., Cleveland 5, O.
Dresser Manufacturing, Div. Dresser Industries, Bradford, Pa.
Finkl, A., & Sons Co., 2011 N. Southport Ave., Chicago 14, Ill.
Frost Gear and Forge Div., Clark Equipment Co., Jackson, Mich.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1. Pa.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
*Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Ladish Drop Forge Co., Cudahy, Wis.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
*Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Oil Well Supply Co., Dallas 1, Tex.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Phoenix Manufacturing Co., 332 S. Michigan Ave., Chicago 4, Ill.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Struthers Wells Corp., Titusville, Pa.
*Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7. N. Y.
Wyman-Gordon Products Corp., Worcester, Mass.

FORGINGS (Machined)

Aircraft Mechanics, Inc., Nevada St., Colorado Springs, Colo.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Dresser Manufacturing, Div. Dresser Industries, Bradford, Pa.
Finkl, A., & Sons Co., 2011 N. Southport Ave., Chicago 14, Ill.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.

FORGINGS (Press)

Bethlehem Steel Co., Bethlehem, Pa.
Canton Drop Forging & Mfg. Co., The, Canton 2, O.
Dresser Manufacturing, Div. Dresser Industries, Bradford, Pa.
Ladish Drop Forge Co., Cudahy, Wis.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.

FORGINGS (Small)

Aircraft Mechanics, Inc., Nevada St., Colorado Springs, Colo.
Dresser Manufacturing, Div. Dresser Industries, Bradford, Pa.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Phoenix Manufacturing Co., 332 S. Michigan Ave., Chicago 4, Ill.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

FORGINGS (Upset)

American Metal Products Co., 5959 Linsdale Ave., Detroit 4, Mich.
Atlas Drop Forge Co., Lansing 2, Mich.
Bethlehem Steel Co., Bethlehem, Pa.
Canton Drop Forging & Mfg. Co., The, Canton 2, O.
Dresser Manufacturing, Div. Dresser Industries, Bradford, Pa.
Federal Screw Works, 3405 Martin Ave., Detroit 10, Mich.
Frost Gear and Forge Div., Clark Equipment Co., Jackson, Mich.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Ladish Drop Forge Co., Cudahy, Wis.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Phoenix Manufacturing Co., 332 S. Michigan Ave., Chicago 4, Ill.
Standard Tube Co., The, 14600 Woodward Ave., Detroit 3, Mich.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14. O.
Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.
Wyman-Gordon Products Corp., Worcester, Mass.

FOUNDRY EQUIPMENT

Ajax Flexible Coupling Co., 4 English St., Westfield, N. Y.
American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Buffalo Wire Works Co., Inc., 437 Terrace Rd., Buffalo 2, N. Y.
Delta Mfg. Co., The, 708N E. Vienna Ave., Milwaukee 1, Wis.
Hall, C. M., Lamp Co., 1005 E. Hancock St., Detroit 7, Mich.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N. Minneapolis 11, Minn.
Pangborn Corporation, Hagerstown, Md.
Ransohoff, N., Inc., 1317 Township Ave., Cincinnati 16, O.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.

FRAMES (Automobile)

Parish Pressed Steel Co., Reading, Pa.

FRAMES (Motor Truck, Trailer & Bus)

Parish Pressed Steel Co., Reading, Pa.

FROGS AND SWITCHES

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

FUEL OIL ADDITIVE

Hood Refining Co., N. Hamilton Ave., Greensburg, Pa.

FURNACE EQUIPMENT (Water Cooled)

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.

FURNACE INSULATION—See INSULATION

FURNACES (Brazing)

Ajax Electric Co., Inc., 911 Frankford Ave., Philadelphia 23, Pa.
Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
Firth-Sterling Steel Co., McKeesport, Pa.
General Electric Co., Schenectady 5, N. Y.
Hevi Duty Electric Co., 4212 W. Highland Blvd., Milwaukee 1, Wis.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y. 23, N.Y.
Lindberg Engineering Co., 2466 N. Hubbard St., Chicago 12, Ill.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Tate-Jones & Co., Inc., Leetsdale, Pa.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

FURNACES (Controlled Atmosphere)

Bellevue Industrial Furnace Co., 2988 Bellevue Ave., Detroit 7, Mich.
Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich.
Lindberg Engineering Co., 2466 N. Hubbard St., Chicago 12, Ill.
Tate-Jones & Co., Inc., Leetsdale, Pa.

FURNACES (Electric Heating)

Ajax Electric Co., Inc., 911 Frankford Ave., Philadelphia 23, Pa.
Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
General Electric Co., Schenectady 5, N. Y.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Hevi Duty Electric Co., 4212 W. Highland Blvd., Milwaukee 1, Wis.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y. 23, N.Y.
Lindberg Engineering Co., 2466 N. Hubbard St., Chicago 12, Ill.
Mahr Mfg Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1257, Pittsburgh 30, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

FURNACES (Electric Melting)

Ajax Engineering Corp., P. O. Box 1418, Trenton 7, N. J.
Ajax Electrothermic Corp., Ajax Park, Trenton 5. N. J.
Ajax Electric Furnace Corp., 1108 Frankford Ave., Philadelphia 23, Pa.
American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Detroit Electric Furnace Div., Kuhlman Electric Co., Bay City, Mich.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y. 23, N.Y.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1257, Pittsburgh 30, Pa.
Swindell-Dressler Corp., P. O. Box 1888, Pittsburgh 30, Pa.

FURNACES (Enameling)

Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
General Electric Co., Schenectady 5, N. Y.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Hall, C. M., Lamp Co., 1005 E. Hancock St., Detroit 7, Mich.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Maehler, Paul, Co., The, 2208 W. Lake St., Chicago 12, Ill.

FURNACES (Forging)

Ajax Electric Co., Inc., 911 Frankford Ave., Philadelphia 23, Pa.
Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Amsler-Morton Co., The, Div. of Union Mining Co., Fulton Bldg., Pittsburgh 22, Pa.
Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y. 23, N.Y.
Lansing Engineering Co., 934-36 Clark St., Lansing 8, Mich.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Pennsylvania Industrial Engineers, Div. of Union Mining Co., 2418 W. Magnolia St., Pittsburgh 12, Pa.

FURNACES (Forging) (Con.)

R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp., P. O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Leetsdale, Pa.
Wilson, Lee, Engineering Co., Inc., 20005 Lake Rd., Cleveland 16, O.

FURNACES (Galvanizing)

Bellevue Industrial Furnace Co., 2988 Bellevue Ave., Detroit 7, Mich.
General Electric Co., Schenectady 5, N. Y.
Hilton Rd., Ferndale, Mich.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Pennsylvania Industrial Engineers, Div. of Union Mining Co., 2413 W. Magnolia St., Pittsburgh 12, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Tate-Jones & Co., Inc., Leetsdale, Pa

FURNACES (Gas or Oil)

Bellevue Industrial Furnace Co., 2988 Bellevue Ave., Detroit 7, Mich.
Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Johnson Gas Appliance Co., 626 "E" Ave., N. W. Cedar Rapids, Iowa.
Lansing Engineering Co., 934-36 Clark St., Lansing 8, Mich.
Lindberg Engineering Co., 2466 N. Hubbard St., Chicago 12, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp., P. O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Leetsdale, Pa.

FURNACES (Heat Treating, Annealing, Carburizing, Hardening, Tempering)

Ajax Electric Co., Inc., 911 Frankford Ave., Philadelphia 23, Pa.
Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Amsler-Morton Co., The, Div. of Union Mining Co., Fulton Bldg., Pittsburgh 22, Pa.
Bellevue Industrial Furnace Co., 2988 Bellevue Ave., Detroit 7, Mich.
Despatch Oven Co., 619 Eighth St., S E., Minneapolis 14, Minn.
Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
General Electric Co., Schenectady 5, N. Y.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Hall, C. M., Lamp Co., 1005 E. Hancock St., Detroit 7, Mich.
Hevi Duty Electric Co., 4212 W. Highland Blvd., Milwaukee 1, Wis
Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Johnson Gas Appliance Co., 626 "E" Ave., N. W., Cedar Rapids, Iowa.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore 2, Md.
Lansing Engineering Co., 934-36 Clark St., Lansing 8, Mich.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y. 23, N.Y.
Lindberg Engineering Co., 2466 N. Hubbard St., Chicago 12, Ill.
Maehler, Paul, Co., The, 2208 W. Lake St., Chicago 12, Ill.
Pennsylvania Industrial Engineers, Div. of Union Mining Co., 2413 W. Magnolia St., Pittsburgh 12, Pa.
R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp., P. O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Leetsdale, Pa.
Wean Engineering Co., Inc., The, Warren, O.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.
Wilson, Lee, Engineering Co., Inc., 20005 Lake Rd., Cleveland 16, O.

FURNACES (Induction Melting)

Ajax Electric Furnace Corp., 1108 Frankford Ave., Philadelphia 23, Pa.
Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Ajax Engineering Corp., P. O. Box 1418, Trenton 7, N. J.

FURNACES (Laboratory)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Hall, C. M., Lamp Co., 1005 E. Hancock St., Detroit 7, Mich.
Hevi Duty Electric Co., 4212 W. Highland Blvd., Milwaukee 1, Wis.
Johnson Gas Appliance Co., 626 "E" Ave., N. W., Cedar Rapids, Iowa.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y. 23, N.Y.
Lindberg Engineering Co., 2466 N. Hubbard St., Chicago 12, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Tate-Jones & Co., Inc., Leetsdale, Pa.

FURNACES (Nonferrous Melting)

Ajax Electric Furnace Corp., 1108 Frankford Ave., Philadelphia 23, Pa.
Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Ajax Engineering Corp., P. O. Box 1418, Trenton 7, N. J.
Bellevue Industrial Furnace Co., 2988 Bellevue Ave., Detroit 7, Mich.
Detroit Electric Furnace Div., Kuhlman Electric Co., Bay City, Mich.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y. 23, N.Y.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Tate-Jones & Co., Inc., Leetsdale, Pa.

FURNACES (Open Hearth)

Amsler-Morton Co., The, Div. of Union Mining Co., Fulton Bldg., Pittsburgh 22, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Swindell-Dressler Corp., P. O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Leetsdale, Pa.

FURNACES (Portable)

Bellevue Industrial Furnace Co., 2988 Bellevue Ave., Detroit 7, Mich.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Hall, C. M., Lamp Co., 1005 E. Hancock St., Detroit 7, Mich.
Tate-Jones & Co., Inc., Leetsdale, Pa.

FURNACES (Recuperative)

Amsler-Morton Co., The, Div. of Union Mining Co., Fulton Bldg., Pittsburgh 22, Pa.
Bellevue Industrial Furnace Co., 2988 Bellevue Ave., Detroit 7, Mich.
Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Industrial Oven Engineering Co., 11621 Detroit Ave., Cleveland 2, O.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp., P. O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Leetsdale, Pa.

FURNACES (Rivet Heating)

Ajax Electric Co., Inc., 911 Frankford Ave., Philadelphia 23, Pa.
Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y. 23, N.Y.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Tate-Jones & Co., Inc., Leetsdale, Pa.

FURNACES (Sheet and Tin Mill)

Amsler-Morton Co., The, Div. of Union Mining Co., Fulton Bldg., Pittsburgh 22, Pa.
Bellevue Industrial Furnace Co., 2988 Bellevue Ave., Detroit 7, Mich.
Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Hall, C. M., Lamp Co., 1005 E. Hancock St., Detroit 7, Mich.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore 2, Md.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp., P. O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Leetsdale, Pa.
Wean Engineering Co., Inc., The, Warren, O.
Wilson, Lee, Engineering Co., Inc., 20005 Lake Rd., Cleveland 16, O.

FURNACES (Steel Mill)

Amsler-Morton Co., The, Div. of Union Mining Co., Fulton Bldg., Pittsburgh 22, Pa.
Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore 2, Md.
Pennsylvania Industrial Engineers, Div. of Union Mining Co., 2413 W. Magnolia St., Pittsburgh 12, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp., P. O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Leetsdale, Pa.
Wean Engineering Co., Inc., The, Warren, O.
Wilson, Lee, Engineering Co., Inc., 20005 Lake Rd., Cleveland 16, O.

FURNACES (Welding)

Bellevue Industrial Furnace Co., 2988 Bellevue Ave., Detroit 7, Mich.
Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.

FURNITURE (Shop)

New Britain Machine Co., New Britain, Conn.

GAGE BLOCKS

Continental Machines, Inc., 1324 Washington Ave., Minneapolis 4, Minn.

GAGES

Ace Mfg. Co., 1211 E. Erie Ave., Philadelphia 24, Pa.
Bone Tool & Gauge Co., 9910 Freeland Ave., Detroit 27, Mich.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Firth-Sterling Steel Co., McKeesport, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Redford Engineering Co., 21200 E. 8 Mile Rd., Detroit 19, Mich.
Scherr, George, Co., 202 Lafayette St., New York 12, N. Y.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.
Stewart-Warner Corp., Instrument Div., 1828 W. Diversey Blvd., Chicago 14, Ill.
Trico Products Corp., 43 Trico Square, Buffalo 3, N. Y.
Turner Gage Grinding Co., 2625 Hilton Rd., Ferndale 20, Mich.
Vinco Corp., Schaefer and Joy Rds., Detroit 27, Mich.
Woodworth, N. A., Co., 1300 E. Nine Mile Rd., Detroit 20, Mich.

GAGES (Automatic Control & Recording)

Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.

GAGES (Hard Faced)

Redford Engineering Co., 21200 E. 8 Mile Rd., Detroit 19, Mich.
Vinco Corp., Schaefer and Joy Rds., Detroit 27, Mich.
Woodworth, N. A., Co., 1300 E. Nine Mile Rd., Detroit 20, Mich.

GAGES (Indicating and Recording)

Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
General Electric Co., Schenectady 5, N. Y.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.
Vinco Corp., Schaefer and Joy Rds., Detroit 27, Mich.
Westinghouse Electric Corp., Orange Ave., Newark 1, N. J.

GAGES (Pressure & Vacuum Recording)

Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.

GAGES (Thread-Ring & Plug)

Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Electric Eye Equipment Co., 11 W Fairchild St., Danville, Ill.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.
Turner Gage Grinding Co., 2625 Hilton Rd., Ferndale 20, Mich.
Vinco Corp., Schaefer and Joy Rds., Detroit 27, Mich.

GALVANIZING (Electro)

Meaker Co., The, 1635 S. 55th Ave., Chicago 50, Ill.

GALVANIZING (Hot Dip)

Acme Galvanizing, Inc., Milwaukee 7, Wis.
Acme Steel & Malleable Iron Works, Buffalo, N. Y.
American Hot Dip Galvanizers Assoc., Inc., 1st National Bank Bldg., Pittsburgh 22, Pa.
American Tinning & Galvanizing Co., Erie, Pa.
Atlantic Stamping Co., Rochester, N. Y.
Atlantic Steel Co., Atlanta, Ga.
Atlas Galvanizing Inc., Los Angeles, Calif.
Buffalo Wire Works Co., Inc., 437 Terrace Rd., Buffalo 2, N. Y.
Cattie, Jos. P., & Bros., Gaul and Letterly Sts., Philadelphia 25, Pa.
Columbian Steel Tank Co., Kansas City 7, Mo.
Commercial Metals Treating, Inc., 177 S. St. Clair St., Toledo 1, O.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Emsco Derrick & Equipment Co., Los Angeles 54, Calif.
Enterprise Galvanizing Co., 3525 E. Cumberland St., Philadelphia 25, Pa.
Equipment Steel Products Div. of Union Asbestos and Rubber Co., Blue Island, Ill.

GALVANIZING (Hot Dip) (Con.)

Fanner Mfg. Co., The, Cleveland, O.
Finn, John, Metal Works, San Francisco 7, Cal.
Galvanizers Incorporated, Portland, Ore.
Gregory, Thomas, Galvanizing Works, Maspeth, N. Y.
Hanlon-Gregory Galvanizing Co., 5515 Butler St., Pittsburgh 1, Pa.
Hill, James, Mfg. Co., Providence, R. I.
Hubbard & Co., Oakland, Calif.
Independent Galvanizing Co., Newark, N. J.
International Derrick & Equipment Co., Torrance, Calif.
International-Stacey Corp., Columbus 8, O.
Isaacson Iron Works, Seattle 14, Wash.
Joslyn Co. of California, Los Angeles, Calif.
Joslyn Mfg. & Supply Co., Chicago 9, Ill.
Koven, L. O., & Bro., Inc., Jersey City, N. J.
Laughlin, Thomas, Co., Portland, Maine.
Lehigh Structural Steel Co., Allentown, Pa.
Lewis Bolt & Nut Co., Minneapolis, Minn.
Los Angeles Galvanizing Co., Huntington Park, Calif.
Missouri Rolling Mill Corp., St. Louis 10, Mo.
National Telephone Supply Co., The, Cleveland 3, O.
Newark Galvanizing Co., The, Newark, O.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Rheem Mfg. Co., Richmond, Calif.
Rheem Research Products Inc., 206 Standard Oil Bldg., Baltimore 2, Md.
Riverside Foundry & Galvanizing Co., Kalamazoo, Mich.
San Francisco Galvanizing Works, San Francisco, Calif.
Scaife Co., Ann St., Oakmont, Pa.
Southern Galvanizing Co., Baltimore 30, Md.
Standard Galvanizing Co., Chicago 18, Ill.
Superior Pacific Galvanizing Co., Los Angeles, Calif.
Western Galvanizing Co., Los Angeles 23, Calif.
Wilcox Crittenden & Co., Inc., Middletown, Conn.
Witt Cornice Co., The, Cincinnati 14, O.

GALVANIZING EQUIPMENT (Electro)

Hanson-Van Winkle-Munning Co., Matawan, N. J.
Meaker Co., The, 1635 S. 55th St., Chicago 50, Ill.

GALVANIZING PLANTS FOR SHEETS

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Erie Foundry Co., Erie, Pa.
Wean Engineering Co., Inc., The, Warren, O.

GALVANIZING PRODUCTS

Commercial Metals Treating, Inc., 177 S. St. Clair St., Toledo 1, O.
Enterprise Galvanizing Co., 3525 E. Cumberland St., Philadelphia 25, Pa.

GAS HOLDERS

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Bethlehem Steel Co., Bethlehem, Pa.

GAS MASKS

Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

GAS PRODUCER PLANTS

Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Morgan Construction Co., Worcester 5, Mass.
Wood, R. D., 400 Chestnut St., Philadelphia 5, Pa.

GAS RECOVERY COKE OVENS AND GAS PLANTS

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

GAS SCRUBBERS AND WASHERS

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.

GASKETS (Asbestos, Metal or Rubber)

Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
National Lead Co., 111 Broadway, New York 6, N. Y.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.

GATES (Iron & Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Wire Works Co., Inc., 437 Terrace Rd., Buffalo 2, N. Y.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.

GEAR BLANKS

American Welding & Mfg. Co., The, Warren, O.
Ampco Metal Inc., Dept. S6, Milwaukee 4, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Cleveland Welding Co., The, W. 117th St. & Berea Rd., Cleveland 7, O.
Commercial Forgings Co., The, 3700 E. 91st St., Cleveland 5, O.
Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.
Finkl, A., & Sons Co., 2011 N. Southport Ave., Chicago 14, Ill.
Foote Bros. Gear & Machine Co., 5225 S. Western Blvd., Chicago 9, Ill.
Frost Gear and Forge Div., Clark Equipment Co., Jackson, Mich.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Ladish Drop Forge Co., Cudahy, Wis.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Philadelphia Gear Works, Erie Ave. & G St., Philadelphia 34, Pa.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Union Steel Castings Div., Blaw-Knox Co., 62nd & Butler Sts., Pittsburgh 1, Pa.
U. S. Automatic Corp., Amherst, O.
Waldron, John, Corp., New Brunswick, N. J.

GEAR MACHINERY (Generating)

Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
National Broach & Machine Co., 5600 St. Jean, Detroit 13, Mich.

GEAR MACHINERY (Lapping, Finishing, Checking)

Farrel-Birmingham Co., Inc., Ansonia, Conn.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.
Vinco Corp., Schaefer and Joy Rds., Detroit 27, Mich.

GEARS (Nonmetallic)

Atlantic Gear Works, 200 Lafayette St., New York 12, N. Y.
Chicago Rawhide Mfg. Co., 1308 Elston Ave., Chicago 22, Ill.
Foote, Brad, Gear Works, 1309 S. Cicero Ave., Cicero 50, Ill.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
General Electric Co., Schenectady 5, N. Y.
Illinois Gear & Machine Co., 2108 N. Natchez Ave., Chicago 35, Ill.
Industrial Gear Mfg. Co., 4545 W. Van Buren St., Chicago 24, Ill.
Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.
Waldron, John, Corp., New Brunswick, N. J.

GEARS (Steel Laminated)

Illinois Gear & Machine Co., 2108 N. Natchez Ave., Chicago 35, Ill.
Industrial Gear Mfg. Co., 4545 W. Van Buren St., Chicago 24, Ill.
Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.
Waldron, John, Corp., New Brunswick, N. J.

GEARS (Worm)

Atlantic Gear Works, 200 Lafayette St., New York 12, N. Y.
Cleveland Worm & Gear Co., The, 3270 E. 80th St., Cleveland 4, O.
DeLaval Steam Turbine Co., Trenton, N. J.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Fairfield Manufacturing Co., 303 S. Earle Ave., Lafayette, Ind.
Foote Bros. Gear & Machine Co., 5225 S. Western Blvd., Chicago 9, Ill.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
Illinois Gear & Machine Co., 2108 N. Natchez Ave., Chicago 35, Ill.
Industrial Gear Mfg. Co., 4545 W. Van Buren St., Chicago 24, Ill.
James, D. O., Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Philadelphia Gear Works, Erie Ave. & G St., Philadelphia 34, Pa.
Pittsburgh Gear & Machine Co., 2680-2700 Smallman St., Pittsburgh 22, Pa.
Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.
Steel Products Engineering Co., The, 1205 W. Columbia St., Springfield, O.

GEARS AND GEAR CUTTING

Atlantic Gear Works, 200 Lafayette St., New York 12, N. Y.
DeLaval Steam Turbine Co., Trenton, N. J.
Dodge Manufacturing Corp., Mishawaka, Ind.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Fairfield Manufacturing Co., 303 S. Earl Ave., Lafayette, Ind.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Foote, Brad, Gear Works, 1309 S. Cicero Ave., Cicero 50, Ill.
Foote Bros. Gear & Machine Co., 5225 S. Western Blvd., Chicago 9, Ill.
Frost Gear and Forge Div. Clark Equipment Co., Jackson, Mich.
General Electric Co., Schenectady 5, N. Y.
Grant Gear Works, 2nd & B Sts., Boston 27, Mass.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
Illinois Gear & Machine Co., 2108 N. Natchez Ave., Chicago 35, Ill.
Industrial Gear Mfg. Co., 4545 W. Van Buren St., Chicago 24, Ill.
James, D. O., Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Jones, W. A., Fdry. & Mach. Co., 4437 Roosevelt Rd., Chicago 24, Ill.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Moraine Products Div., General Motors Corp., Dayton 1, O.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, Ohio
Philadelphia Gear Works, Erie Ave. & G St., Philadelphia 34, Pa.
Pittsburgh Gear & Machine Co., 2680-2700 Smallman St., Pittsburgh 22, Pa.
Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.
Steel Products Engineering Co., The, 1205 W. Columbia St., Springfield, O.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Westinghouse Electric Corp., 200 McCandless Ave., Pittsburgh 1, Pa.

GENERATING SETS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Century Electric Co., 1806 Pine St., St. Louis 3, Mo.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
DeLaval Steam Turbine Co., Trenton, N. J.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
General Electric Co., Schenectady 5, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukeee 14, Wis.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Kato Engineering Co., Mankato, Minn.
Master Electric Co., The, 100 Davis Ave., Dayton 1, O.
Ready-Power Co., The, 3842 Grand River Ave., Detroit 8, Mich.
Reliance Electric & Eng. Co., 1088 Ivanhoe Rd., Cleveland 10, O.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

GENERATORS (Acetylene—Portable and Stationary)

Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.

GENERATORS (Electric)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Century Electric Co., 1806 Pine St., St. Louis 3, Mo.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
General Electric Co., Schenectady 5, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Kato Engineering Co., Mankato, Minn.
Lincoln Electric Co., The, Cleveland 1, O.
Master Electric Co., The, 100 Davis Ave., Dayton 1, O.
Reliance Electric & Eng. Co., 1088 Ivanhoe Rd., Cleveland 10, O.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

GENERATORS (Plating)

Hanson-Van Winkle-Munning Co., Matawan, N. J.
Meaker Co., The, 1635 S. 55th Ave., Chicago 50, Ill.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

GLUE (Glue & Abrasive Mixed)

Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.

GLUE (Liquid Cold)

Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.

GOGGLES (Safety)

Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

GRABS—FOR SHEETS, COILS, INGOTS

J-B Engineering Sales Co., 3101 East St., New Haven 3, Conn.

GRAPHITE

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
The United States Graphite Co., Saginaw, Mich.

GRAPPLES (Scrap Iron)

Blaw-Knox Div. of Blaw-Knox Co., Blawknox, Pa.
General Excavator Co., The, Marion, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Osgood Co., The, Marion, O.
Owen Bucket Co., 6013 Breakwater Ave., Cleveland, O.

GRATING

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Hendrick Mfg. Co., 37 Dundaff St. Carbondale, Pa.
Tri-Lok Co., 5515 Butler St., Pittsburgh 1, Pa.

GREASE (Lubricating)—See LUBRICANTS (Industrial)

GREASE SEALS

Chicago Rawhide Mfg. Co., 1308 Elston Ave., Chicago 22, Ill.
Gits Brothers Mfg. Co., 1836 S. Kilbourn Ave., Chicago 23, Ill.

GRILLS (Perforated Metal)

Buffalo Wire Works Co., Inc., 437 Terrace Rd., Buffalo 2, N. Y.
Diamond Mfg. Co., Wyoming, Pa.
Hendrick Mfg. Co., 37 Dundaff St. Carbondale, Pa.

GRINDER ATTACHMENTS

Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cincinnati Grinders, Incorporated, Cincinnati 9, O.
Clark, Robert H., Co., 9330 Santa Monica Blvd., Beverly Hills, Cal.
Delta Mfg. Co., The, 703N E. Vienna Ave., Milwaukee 1, Wis.
Fitchburg Grinding Machine Corp., Fitchburg, Mass.
Landis Machine Co., Waynesboro, Pa.
Landis Tool Co., Waynesboro, Pa.
Lee, K. O., Company, Aberdeen, S. Dak.
Norton Co., Worcester 6, Mass.

GRINDER CENTERS

Firth-Sterling Steel Company, McKeesport, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

GRINDER HEADS

Fitchburg Grinding Machine Corp., Fitchburg, Mass.

GRINDERS (Automotive Reconditioning)

Heald Machine Co., The, Worcester 6, Mass.

GRINDERS (Bench & Floor Type)

Bridgeport Safety Emery Wheel Co., Inc., The, P.O. Box 2031 Stratford, Bridgeport, Conn.
Delta Mfg. Co., The, 703N E. Vienna Ave., Milwaukee 1, Wis.
Haskins, R. G., Co., 615 California Ave., Chicago 12, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

GRINDERS (Centerless—Internal and External)

Cincinnati Grinders, Incorporated, Cincinnati 9, O.
Heald Machine Co., The, Worcester 6, Mass.
Landis Tool Co., Waynesboro, Pa.

GRINDERS (Chucking)

Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Fitchburg Grinding Machine Corp., Fitchburg, Mass.
Heald Machine Co., The, Worcester 6, Mass.

GRINDERS (Crank Pin, Cam, Piston, Valve Face)

Cincinnati Grinders, Incorporated, Cincinnati 9, O.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester 6, Mass.

GRINDERS (Cylindrical)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cincinnati Grinders, Incorporated, Cincinnati 9, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester 6, Mass.

GRINDERS (Die)

Fitchburg Grinding Machine Corp., Fitchburg, Mass.
Landis Machine Co., Waynesboro, Pa.

GRINDERS (Oscillating)

Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.

GRINDERS (Plain and Universal)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cincinnati Grinders, Incorporated, Cincinnati 9, O.
Delta Mfg. Co., The, 703N E. Vienna Ave., Milwaukee 1, Wis.
Fitchburg Grinding Machine Corp., Fitchburg, Mass.
Landis Tool Co., Waynesboro, Pa.
LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Lee, K. O., Company, Aberdeen, S. Dak.
Norton Co., Worcester 6, Mass.

GRINDERS (Portable)

Chicago Wheel & Manufacturing Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Cleveland Pneumatic Tool Co., The 3781 E. 77th St., Cleveland 5, O.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.
Syntron Co., 370 Lexington Ave., Homer City, Pa.

GRINDERS (Precision Thread)

Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Jones & Lamson Machine Co., Springfield, Vt.
Landis Machine Co., Waynesboro, Pa.
Landis Tool Co., Waynesboro, Pa.

GRINDERS (Roll)

Farrel-Birmingham Co., Inc., Ansonia, Conn.
Landis Tool Co., Waynesboro, Pa.
Lewis Fdry. & Mach. Div. of Blaw-Knox Co., Pittsburgh 30, Pa.

GRINDERS (Roll)

Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Mesta Machine Co., P. O. Box 1466 Pittsburgh 30, Pa.
Norton Co., Worcester 6, Mass.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

GRINDERS (Shear Knife)

Bridgeport Safety Emery Wheel Co., Inc., The, P.O. Box 2031 Stratford, Bridgeport, Conn.
Fitchburg Grinding Machine Corp., Fitchburg, Mass.
Mattison Machine Works, Rockford, Ill.

GRINDERS (Sheet Steel & Internal Tube)

Mattison Machine Works, Rockford, Ill.

GRINDERS (Single Slide Internal)

Bryant Chucking Grinder Co., 257 Clinton St. Springfield, Vt.

GRINDERS (Snagging)

Bridgeport Safety Emery Wheel Co., Inc., The, P.O. Box 2031 Stratford, Bridgeport, Conn.

GRINDERS (Spline)

Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Fitchburg Grinding Machine Corp., Fitchburg, Mass.
Vinco Corp., Schaefer and Joy Rds., Detroit 27, Mich.

GRINDERS (Surface)

Bridgeport Safety Emery Wheel Co., Inc., The, P.O. Box 2031 Stratford, Bridgeport, Conn.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Continental Machines, Inc., 1324 Washington Ave., Minneapolis 4, Minn.
Delta Mfg. Co., The, 703N E. Vienna Ave., Milwaukee 1, Wis.
Heald Machine Co., The, Worcester 6, Mass.
Mattison Machine Works, Rockford, Ill.
Norton Co., Worcester 6, Mass.
Reid Brothers Co., Inc., 140 Elliott St., Beverly, Mass.

GRINDERS (Tool and Cutter)

Bridgeport Safety Emery Wheel Co., Inc., The, P.O. Box 2031 Stratford, Bridgeport, Conn.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Cincinnati Milling Machine Co., Cincinnati 9, O.
Delta Mfg. Co., The, 703N E. Vienna Ave., Milwaukee 1, Wis.
Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Fitchburg Grinding Machine Corp., Fitchburg, Mass.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis.
Landis Tool Co., Waynesboro, Pa.
LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Lee, K. O., Co., Aberdeen, S. Dak.
Norton Co., Worcester 6, Mass.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.

GRINDING (Shear Knife)

American Shear Knife Co., P.O. Box 355, Homestead, Pa.

GRINDING (Surface)

Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Industrial Gear Mfg. Co., 4545 W. Van Buren St., Chicago 24, Ill.

GRINDING FIXTURES (Hole Cutter Blades)

Clark, Robert H., Co., 9330 Santa Monica Blvd., Beverly Hills, Cal.

GRINDING FIXTURES (Thread Tool)

Clark, Robert H., Co., 9330 Santa Monica Blvd., Beverly Hills, Cal.

GRINDING MACHINES (Gear)

Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Fitchburg Grinding Machine Corp., Fitchburg, Mass.

GRINDING—PRECISION (Contract)

Ace Mfg. Corp., 1211 E. Erie Ave., Philadelphia 24, Pa.
Burgess-Norton Mfg. Co., 778 Peyton St., Geneva, Ill.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Industrial Gear Mfg. Co., 4545 W. Van Buren St., Chicago 24, Ill.
Vinco Corp., Schaefer and Joy Rds. Detroit 27, Mich.

GRINDING WHEELS

Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
Bridgeport Safety Emery Wheel Co., Inc., The, P.O. Box 2031 Stratford, Bridgeport, Conn.
Carborundum Co., The, Niagara Falls, N. Y.
Chicago Wheel and Mfg. Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
deSanno, A. P., & Son Inc., 436 Wheatland St., Phoenixville, Pa.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Macklin Company, Jackson, Mich.
Norton Co., Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7, Mich.
Safety Grinding Wheel & Machine Co., P. O. Box 746, Springfield, O.
Simonds Worden White Co., 714 Negley Place, Dayton 7, O.
Sterling Grinding Wheel Div., of The Cleveland Quarries Co., Tiffin, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

GRINDING WHEELS (Mounted)

Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.
Carborundum Co., The, Niagara Falls, N. Y.
Chicago Wheel & Manufacturing Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
deSanno, A. P., & Son Inc., 436 Wheatland St., Phoenixville, Pa.
Macklin Company, Jackson, Mich.
Norton Co., Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7, Mich.
Simonds Worden White Co., 714 Negley Place, Dayton 7, O.

GRINDING WHEELS (Segmental)

Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.
Bridgeport Safety Emery Wheel Co., Inc., The, P.O. Box 2031 Stratford, Bridgeport, Conn.
Carborundum Co., The, Niagara Falls, N. Y.
Macklin Company, Jackson, Mich.
Norton Co., Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7, Mich.
Simonds Worden White Co., 714 Negley Place, Dayton 7, O.
Sterling Grinding Wheel Div., of The Cleveland Quarries Co., Tiffin, O.

GUARDS (Wire)

Buffalo Wire Works Co., Inc., 437 Terrace Rd., Buffalo 2, N. Y.

GUIDES (Mill)

Ampco Metal Inc., Dept. S-11, Milwaukee 4, Wis.
Haynes Stellite Co., 30 E. 42nd St., New York 17, N. Y.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.

GUIDES (Valve)

Ampco Metal, Inc., 1745 S. 38th St., Dept. S6, Milwaukee 4, Wis.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.

GUNS (Blast Furnace Mud)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Brosius, Edgar E. Co., Sharpsburg P. O., Pittsburgh 15, Pa.

GUNS (Steam, Hydraulic, Electric)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Brosius, Edgar E. Co., Sharpsburg P. O., Pittsburgh 15, Pa.

HAMMER BOARDS

Irwin Mfg. Co., Garland, Pa.

HAMMERS (Drop)

Alliance Machine Co., The, Alliance, O.
Chambersburg Engineering Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
Industrial Brownhoist Corp., Bay City, Mich.
Morgan Engineering Co., The, Alliance, O.

HAMMERS (Pneumatic)

Cleveland Pneumatic Tool Co., The, 3781 E. 77th St., Cleveland 5, O.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

HAMMERS (Power)

Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

HAMMERS (Steam)

Alliance Machine Co., The, Alliance, O.
Chambersburg Engineering Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
Industrial Brownhoist Corp., Bay City, Mich.
Morgan Engineering Co., The, Alliance, O.

HANGERS

Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
Link-Belt Co., 519 N. Holmes Ave., Indianapolis 6, Ind.
Power Piping Div. of Blaw-Knox Co., Beaver & Western Ave., Pittsburgh 2, Pa.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia 34, Pa.

HAULAGE SYSTEMS

Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.

HEADING MACHINERY

National Machinery Co., Tiffin, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.

HEAT EXCHANGERS

Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Niagara Blower Co., Dept. S-54, 6 E. 45th St., New York 17, N. Y.
Ross Heater & Mfg. Co., Inc., 1431 West Ave., Buffalo 13, N Y.
Stewart-Warner Corp., Heater Div., 1828 W. Diversey Blvd., Chicago 14, Ill.
Standard Tube Co., The, 14600 Woodward Ave., Detroit 3, Mich.
Struthers Wells Corp., Titusville, Pa.

HEAT TREATING and HARDENING

Burgess-Norton Mfg. Co., 778 Peyton St., Geneva, Ill.
Commercial Metals Treating, Inc., 177 S. St. Clair St., Toledo 1, O.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Lakeside Steel Improvement Co., The, 5418 Lakeside Ave., Cleveland 14, O.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Pittsburgh Commercial Heat Treating Co., 49th St., & A.V.R.R., Pittsburgh 1, Pa.

HEAT TREATING MATERIALS

Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

HEATERS (Air)

Babcock & Wilcox Co., 85 Liberty St., New York 6, N. Y.
Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Mahon, R. C., Co., The, 8650 Mt. Elliot Ave., Detroit 11, Mich.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Standard Tube Co., The, 14600 Woodward Ave., Detroit 3, Mich.

HEATERS (Instantaneous)

Ross Heater & Mfg. Co., Inc., 1431 West Ave., Buffalo 13, N. Y.

HEATERS (Unit)

American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Cutler-Hammer Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Hall, C. M., Lamp Co., 1005 E. Hancock St., Detroit 7, Mich.
Niagara Blower Co., Dept. S-54, 6 E. 45th St., New York 17, N. Y.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Stewart-Warner Corp., Heater Div., 1828 W. Diversey Blvd., Chicago 14, Ill.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Westinghouse Electric Corp., Mansfield, O.

HEATING EQUIPMENT (Radiant)

Hall, C. M. Lamp Co., 1005 E. Hancock St., Detroit 7, Mich.

HELMETS (Blast Cleaning)

American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.
Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

HELMETS (Welding)

Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

HINGES AND BUTTS

Veeder-Root, Inc., Hartford 2, Conn
Wagner, E. R., Mfg. Co., 4615 N. 32nd St., Milwaukee 9, Wis.

HITCHINGS (Mine Car)

American Chain & Cable Co., Inc., Bridgeport 2, Conn.

HOB CHECKING MACHINES

Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.

HOBS

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.

HOIST (Chain)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Chicago Tramrail Co., 2912 W. Carroll Ave., Chicago 12, Ill.
Chisholm-Moore Hoist Corp., 118 Fremont St., Tonawanda, N. Y.
Cleveland Tramrail Div., of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Ford Chain Block Div., American Chain & Cable Co., Inc., 2nd & Diamond Sts., Philadelphia 22, Pa.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Wright Mfg. Div. of American Chain & Cable Co., Inc., York, Pa.

HOISTS (Electric)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Browning, Victor R., Co., Inc., Willoughby, O.
Chicago Tramrail Co., 2912 W. Carroll Ave., Chicago 12, Ill.
Chisholm-Moore Hoist Corp., 118 Fremont St., Tonawanda, N. Y.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Brownhoist Corp., Bay City, Mich
Reading Chain & Block Corp., 2102 Adams St., Reading Pa.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Wright Mfg. Div. of American Chain & Cable Co. Inc., York, Pa.

HOISTS (Monorail)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Chicago Tramrail Co., 2912 W. Carroll Ave., Chicago 12, Ill.
Chisholm-Moore Hoist Corp., 118 Fremont St., Tonawanda, N. Y.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Euclid Crane & Hoist Co., The, 1865 Chardon Rd., Euclid, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

HOISTS (Pneumatic)

Curtis Pneumatic Machinery Div. of Curtis Mfg. Co., 1996 Kienlen Ave., St. Louis 20, Mo.
Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

HOISTS (Truck Body)

Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.

HOLE CUTTERS

Wyzenbeek & Staff Inc., 838 W. Hubbard St., Chicago 22, Ill.

HONING MACHINES

Micromatic Hone Corp., 8100 Schoolcraft Ave., Detroit 4, Mich.
Moline Tool Co., 102 20th St., Moline, Ill.
Snyder Tool & Engineering Co., 8400 E. Lafayette St., Detroit 7, Mich.

HOOKS (Chain)

American Chain Div. American Chain & Cable Co., Inc., York, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Phoenix Manufacturing Co., 332 S. Michigan Ave., Chicago 4, Ill.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

HOOPS (Welded Wire)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Keystone Steel & Wire Co., Peoria 7, Ill.

HOOPS—See BANDS AND HOOPS (Iron and Steel)

HOPPERS (Motorized)

Detroit Power Screwdriver Co., 2813 W. Fort St., Detroit 16, Mich.

HOSE (Flexible Metal)

American Metal Hose Branch of The American Brass Co., Waterbury 88, Conn.
Chicago Metal Hose Corp., 1313 S. Third St., Maywood, Ill.
National-Standard Co., Niles, Mich.
Pennsylvania Flexible Metallic Tubing Co., 7250 Powers Lane, Philadelphia 42, Pa.

HOSE (Flexible Nonmetallic)

Weatherhead Co., The, 300 E. 131st St., Cleveland 8, O.

HOSE (Rubber)

Boston Woven Hose & Rubber Co., P.O. Box 1071, Boston 3, Mass.
Cleveland Pneumatic Tool Co., The, 3781 E. 77th St., Cleveland 5, O.
Gates Rubber Co., The, 999 S. Broadway, Denver 17. Colo.
Goodrich, B. F., Co., The, Akron 19, O.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Stewart-Warner Corp., Alemite Div., 1879 W. Diversey Blvd., Chicago 14, Ill.
Trabon Engineering Corp., 1818 E. 40th St., Cleveland 3, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.
United States Steel Supply Co., P.O. Box MM, Chicago 90, Ill.

HOSE CLAMPS, FITTINGS, NIPPLES AND MENDERS

Boston Woven Hose & Rubber Co., P.O. Box 1071, Boston 3, Mass.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Kelly Machinery Co., 2524 W. Madison St., Chicago 12, Ill.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Stewart-Warner Corp., Alemite Div 1879 W. Diversey Blvd., Chicago 14, Ill.
Trabon Engineering Corp., 1818 E 40th St., Cleveland 3, O.

HYDRANTS AND STREET WASHERS

Zurn, J. A., Mfg. Co., Erie, Pa.

HYDRAULIC FLUID

Dow Corning Corp., P. O. Box 592, Midland, Mich.
Moraine Products Div., General Motors Corp., Dayton 1, O.

HYDRAULIC MACHINERY

Albert, L., & Son, Whitehead Rd., Trenton, N. J.
Alliance Machine Co., The, Alliance, O.
Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., Hammond, Ind.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Bliss, E. W., Co., 53rd St. & Second Ave., Brooklyn 32, N. Y.
Chambersburg Engineering Co., Chambersburg, Pa.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Hydraulic Machinery, Inc., 12825 Ford Rd., Dearborn, Mich.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Morgan Engineering Co., The, Alliance, O.
Schloemann Engineering Corp., 1105 Empire Bldg., Pittsburgh 22, Pa.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
Watson-Stillman Co., Roselle, N. J.
Wood, R. D., Co., 400 Chestnut St., Philadelphia 5, Pa.

HYDRAULIC PRESSES—See PRESSES (Hydraulic)

HYDRAULIC UNITS

Adel Precision Products Corp., 10345 Van Owen St., Burbank, Cal.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Denison Enginering Co., The, 1163 Dublin Rd., Columbus 16, O.
Ex-Cell-O Corp. 1228 Oakman Blvd., Detroit 6, Mich.
Hydraulic Machinery, Inc., 12825 Ford Rd., Dearborn, Mich.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Sundstrand Machine Tool Co. 2540 Eleventh St., Rockford, Ill.
Wemman Pump & Supply Co., The, 207-209 Boulevard of the Allies, Pittsburgh 22, Pa.

INDICATORS (Blast Furnace Stock Line)

Brosius, Edgar E., Co., Sharpsburg P. O., Pittsburgh 15, Pa.

INDICATORS (Temperature)

Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
Stewart-Warner Corp., Instrument Div., 1828 W. Diversey Blvd., Chicago 14, Ill.
Westinghouse Electric Corp., Orange Ave., Newark 1, N. J.

INDUCTION BRAZING and SOLDERING EQUIPMENT

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 22 Central Ave., Newark 1, N. J.

INDUCTION BRAZING AND SOLDERING EQUIPMENT

Johnson Gas Appliance Co., 626 "E" Ave., N.W., Cedar Rapids, Iowa.
Lepel High Frequency Laboratories, Inc., 39 W. 60 St., New York 23, N. Y.
Ohio Crankshaft Co., The, 3800 Harvard Ave., Cleveland 1, O.

INDUCTION HARDENING

Chicago Screw Company, The, 1026 S. Homan Ave., Chicago 24, Ill.
Pittsburgh Commercial Heat Treating Co., 49th St. & A.V.R.R., Pittsburgh 1, Pa.

INDUCTION HEATING and HARDENING EQUIPMENT

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
Lepel High Frequency Laboratories, Inc., 39 W. 60 St., New York 23, N. Y.
Ohio Crankshaft Co., The, 3800 Harvard Ave., Cleveland 1, O.
Westinghouse Electric Corp., Baltimore 3, Md.

INFRA-RED EQUIPMENT (Baking, Drying, Dehydrating, Preheating)

Fostoria Pressed Steel Corp., The, Fostoria, O.
Hall, C. M. Lamp Co., 1005 E. Hancock St., Detroit 7, Mich.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.

INGOT MOLD WASH (Graphite)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.

INGOT MOLDS

Bethlehem Steel Co., Bethlehem, Pa.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Shenango-Penn Mold Co., Oliver Bldg., Pittsburgh 22, Pa.
The United States Graphite Co. Saginaw, Mich.
Valley Mould & Iron Corp., Hubbard, O.

INHIBITORS

American Chemical Paint Co., Ambler, Pa.

INSERTS (For Molding In)

Bardwell & McAlister, Inc., P. O. Box 1810, Hollywood 28, Cal.

INSERTS, THREADED (Locked In)

Bardwell & McAlister, Inc., P. O. Box 1310, Hollywood 28, Cal.

INSPECTION EQUIPMENT

Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.
Vinco Corp., Schaefer and Joy Rds., Detroit 27, Mich.
Wilkens-Anderson Co., 111 N. Canal St., Chicago 6, Ill.

INSPECTING TOOLS

Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.
Scherr, George, Co., 202 Lafayette St., New York 12, N. Y.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.
Vinco Corp., Schaefer and Joy Rds., Detroit 27, Mich.

INSTRUMENTS (Counting)

Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Veeder-Root, Inc., Hartford 2, Conn.

INSTRUMENTS (Electric-Indicating and Recording)

Brush Development Company, The, 3353 Perkins Ave., Cleveland 14, O.
Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
General Electric Co., Schenectady 5, N. Y.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
Micht, Herman H., Co., 27 Park Place, New York 7, N. Y.
Westinghouse Electric Corp., Dept. 7N, East Pittsburgh, Pa.

INSTRUMENTS (Testing)

DuMont, Allen B., Laboratories, Inc., 2 Main Ave., Passaic, N. J.
Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Richle Testing Machine Div. American Machine & Metals, Inc., E. Moline, Ill.
Wilkens-Anderson Co., 111 N. Canal St., Chicago 6, Ill.

INSULATING BLOCK OR BRICK

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Carborundum Co., The, Niagara Falls, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
National Fireproofing Corp., 302 E Ohio St., Pittsburgh 12, Pa.
Owens-Corning Fiberglass Corp., 1873 Nicholas Bldg., Toledo 1, O.

INSULATING CONCRETE

Atlas Lumnite Cement Co., Dept. S, Chrysler Bldg., New York 17, N. Y.
Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.

INSULATING CONCRETE

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

INSULATING POWDER AND CEMENT

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Owens-Corning Fiberglass Corp., 1873 Nicholas Bldg., Toledo 1, O.
Union Asbestos & Rubber Co., 1821 S. 54th Ave., Cicero 50, Ill

INSULATION (Building)

Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y
Owens-Corning Fiberglass Corp., 1873 Nicholas Bldg., Toledo 1, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

INSULATION (Electrical)

Owens-Corning Fiberglass Corp., 1873 Nicholas Bldg., Toledo 1, O.

INSULATION (Furnace, Boiler Settings, Ovens, Steam Pipe, Etc.)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
Johns-Manville Corp., 22 E. 40th New York 16, N. Y.
Owens-Corning Fiberglass Corp., 1873 Nicholas Bldg., Toledo 1, O.
Union Asbestos & Rubber Co., 1821 S. 54th Ave., Cicero 50, Ill.

INTERCEPTORS (Grease & Solids)

Zurn, J. A., Mfg. Co., Erie, Pa.

IRON ORE

Alan Wood Steel Co., Conshohocken, Pa.
Cleveland-Cliffs Iron Co., The, Union Commerce Bldg., Cleveland 14, O.
Hanna Furnace Corp., The, Penobscot Bldg., Detroit 26, Mich.
Pickands Mather & Co., Union Commerce Bldg., Cleveland 14, O.
Shenango Furnace Co., Oliver Bldg., Pittsburgh 22, Pa.
Snyder, W. P., & Co., Oliver Bldg., Pittsburgh 22, Pa.

JETS (Steam)

Heil Engineering Co., 12903 Elmwood Ave., Cleveland 11, O.

JIG BORERS

Bryant Machinery & Engineering Co., 400 W. Madison St., Chicago 6, Ill.
Cleereman Machine Tool Co., Green Bay, Wis.

JIGS AND FIXTURES

Ace Mfg. Corp., 1211 E. Erie Ave., Philadelphia 24, Pa.
Algoma Products Co., 3080 E. Outer Dr., Detroit 12, Mich.
Black Boring & Machine Co., 1400 E. 222nd St., Cleveland 17, O.
Bone Tool & Gauge Co., 9910 Freeland Ave., Detroit 27, Mich.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.
Mead Specialties Co., 4114 N. Knox Ave., Chicago 41, Ill.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.
Steel Products Engineering Co., The, 1205 W. Columbia St., Springfield, O.
Vinco Corp., Schaefer and Joy Rds., Detroit 27, Mich.

KETTLES (Galvanizing)

National Annealing Box Co., Washington, Pa.

KEYS (Machine or Woodruff)

Moltrup Steel Products Co., Beaver Falls, Pa.

KNIVES

American Shear Knife Co., P.O. Box 355, Homestead, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Cowles Tool Co., 2086 W. 110th St., Cleveland 2, O.
Disston, Henry, & Sons, Inc., 626 Tacony, Philadelphia 35, Pa.
Simonds Worden White Co., 714 Negeley Place, Dayton 7, O.

LABORATORY WARE

Norton Company, Worcester 6, Mass.
Wilkens-Anderson Co., 111 N. Canal St., Chicago 6, Ill.

LADLES

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Bethlehem Steel Co., Bethlehem, Pa.

LAMPS (Infra-Red)

Fostoria Pressed Steel Corp., The, Fostoria, O.
Hall, C. M., Lamp Co., 1005 E. Hancock St., Detroit 7, Mich.
Verd-A-Ray Corp., 615 Front St., Toledo 5, O.

LAPPING MACHINES

Cincinnti Grinders, Incorporated, Cincinnati 9, O.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
National Broach & Machine Co., 5600 St. Jean, Detroit 13, Mich.
Norton Company, Worcester 6, Mass.

LARRIES (Coal)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Differential Steel Car Co., Findlay, O.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Vulcan Iron Works, Wilkes-Barre, Pa.

LATHE CENTERS

Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Redford Engineering Co., 21200 E. 8 Mile Rd., Detroit 19, Mich.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.
Spe-D-Cut Tool Co., 9th & Lyons Sts., Hannibal, Mo.

LATHE DOGS (Drop Forged)

South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

LATHE TOOLS (Carbide Tipped)

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Spe-D-Cut Tool Co., 9th & Lyons Sts., Hannibal, Mo.

LATHES (Automatic)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Bullard Co., The, Bridgeport 2, Conn.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Jones & Lamson Machine Co., Springfield, Vt.
LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.
Monarch Machine Tool Co., Sidney, O.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.
Sundstrand Machine Tool Co. 2540 Eleventh St., Rockford, Ill.
Wickes Brothers, Saginaw, Mich.

LATHES (Buffing & Polishing)

Bridgeport Safety Emery Wheel Co., Inc., The, P.O. Box 2031 Stratford, Bridgeport, Conn.
Chicago Wheel & Mfg. Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Delta Mfg. Co., The, 703N E. Vienna Ave., Milwaukee 1, Wis.
Walker-Turner Co., Inc., 50128 Berckman St., Plainfield, N. J.

LATHES (Chucking)

Bullard Co., The, Bridgeport 2, Conn.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

LATHES (Crankshaft)

LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Wickes Brothers, Saginaw, Mich.

LATHES (Double End)

Consolidated Machine Tool Corp., 565 Blossom Rd. Rochester 10, N. Y.
Snyder Tool & Engineering Co., 3400 E. Lafayette St., Detroit 7, Mich.
Wickes Brothers, Saginaw, Mich.

LATHES (Engine)

Consolidated Machine Tool Corp., 565 Blossom Rd. Rochester 10, N. Y.
LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Lehmann Machine Co., Chouteau Ave., at Grand, St. Louis 3, Mo.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.
Logan Engineering Co., 4901 W. Lawrence Ave., Chicago 30, Ill.
Monarch Machine Tool Co., Sidney, O.
Simmons Machine To l Corp., 1755 N. Broadway, Albany 1. N. Y.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.
Wickes Brothers, Saginaw, Mich

LATHES (Gap)

LeBlond, R. K., Machine Tool Co., Cincinnati 8, O.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.

LATHES (Gun)

Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
LeBlond, R. K. Machine Tool Co., The, Cincinnati 8, O.
Lehmann Machine Co., Chouteau Ave., at Grand, St. Louis 3, Mo.
Wickes Brothers, Saginaw, Mich.

LATHES (Hollow Spindle or Oil Country)

LeBlond, R. K., Machine Tool Co., Cincinnati 8, O.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.

LATHES (Manufacturing)

Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
LeBlond, R. K., Machine Tool Co., Cincinnati 8, O.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.
Monarch Machine Tool Co., The, Sidney, O.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.

LATHES (Railroad Car & Driving Wheel)

Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.

LATHES (Roll Turning)

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Consolidated Machine Tool Corp., 565 Blossom Rd. Rochester 10, N. Y.
Continental Foundry & Machine Co., E. Chicago, Ind.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

LATHES (Tool Room)

LeBlond, R. K. Machine Tool Co., Cincinnati 8, O.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.
Monarch Machine Tool Co., The, Sidney, O.

LATHES (Turret)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Bullard Company, The, Bridgeport 2, Conn.
Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Jones & Lamson Machine Co., Springfield, Vt.
Logan Engineering Co., 4901 W. Lawrence Ave., Chicago 30, Ill.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.
Simmons Machine Tool Corp., 1755 N. Broadway Albany 1 N. Y.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

LATHES (Turret, Vertical)

Bullard Co., The, Bridgeport 2, Conn.

LEAD (Pigs)

Anaconda Sales Co., 25 Broadway, New York 4, N. Y.

LEAD (Red, White, Litharge)

National Lead Co., 111 Broadway, New York 6, N. Y.

LEAD (Sheets, Pipe, etc.)

National Lead Co., 111 Broadway, New York 6, N. Y.

LEAD (Tellurium)

National Lead Co., 111 Broadway, New York 6, N. Y.

LEVELING MACHINES

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Erie Foundry Co., Erie, Pa.
Hyde Park Foundry & Machine Co. Hyde Park, Pa.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Lewis Fdry. & Mach. Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
McKay Machine Co., The Youngstown 2, O.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Paxson Machine Co., Salem, O.
Wean Engineering Co., Inc., The, Warren, O.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

LIFT TRUCKS—See TRUCKS (Lift)

LIFTING MAGNETS—See MAGNETS (Lifting)

LIFTS (Monorail)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Cleveland Crane & Engineering Co., The, 1125 E. 283rd St., Wickliffe, O.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

LIGHTING (Fluorescent Equipment)

Fostoria Pressed Steel Corp., The, Fostoria, O.
General Electric Co., Sec. A-448-90, Tungar & Metallic Rectifier Div., Bridgeport 2, Conn.
Ward Leonard Electric Co., 63 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., 1216 W. 58th St., Cleveland 1, O.

LIGHTING (Industrial)

Fostoria Pressed Steel Corp., The, Fostoria, O.
Verd-A-Ray Corp., 615 Front St., Toledo 5, O.
Westinghouse Electric Corp., 1216 W. 58th St., Cleveland 1, O.

LIME (Chemical and Fluxing)

Baker, The J. E., Co., 114 N. George St., York, Pa.

LIMESTONE (Open Hearth & Blast Furnace)

Baker, The J. E., Co., 114 N. George St., York, Pa.
Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.

LINERS (Mill)

Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Taylor-Wharton Iron & Steel Co., Easton, Pa.

LINERS (Pump and Cylinder)

Harrisburg Steel Corp., Harrisburg, Pa.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.

LOCOMOTIVE CRANES—See CRANES (Locomotive)

LOCOMOTIVES (Diesel-Electric)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Davenport-Besler Corp., Davenport, Iowa.
Differential Steel Car Co., Findlay, O.
Fate-Root-Heath Co., Plymouth, O.
Plymouth Locomotive Works, Plymouth, O.
Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.
Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVES (Diesel-Mechanical)

Davenport-Besler Corp., Davenport, Iowa.
Fate-Root-Heath Co., Plymouth, O.
Plymouth Locomotive Works, Plymouth, O.
Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.
Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVES (Electric)

Davenport-Besler Corp., Davenport, Iowa.
Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.

LOCOMOTIVES (Electric Trolley)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Differential Steel Car Co., Findlay, O.
General Electric Co., Schenectady 5, N. Y.
Vulcan Iron Works, Wilkes-Barre, Pa.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.
Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVES (Fireless)

Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.

LOCOMOTIVES (Gasoline-Electric)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Davenport-Besler Corp., Davenport, Iowa.
Differential Steel Car Co., Findlay, O.
Fate-Root-Heath Co., Plymouth, O.
General Electric Co., Schenectady 5, N. Y.
Plymouth Locomotive Works, Plymouth, O.
Vulcan Iron Works, Wilkes-Barre, Pa.
Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVES (Gasoline—Mechanical)

Davenport-Besler Corp., Davenport, Iowa.
Differential Steel Car Co., Findlay, O.
Fate-Root-Heath Co., Plymouth, O.
Plymouth Locomotive Works, Plymouth, O.
Vulcan Iron Works, Wilkes-Barre, Pa.
Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVES (Oil-Electric)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Differential Steel Car Co., Findlay, O.
Vulcan Iron Works, Wilkes-Barre, Pa.

LOCOMOTIVES (Steam)

Davenport-Besler Corp., Davenport, Iowa.
Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.

LOCOMOTIVES (Storage Battery)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
General Electric Co., Schenectady 5, N. Y.
Vulcan Iron Works, Wilkes-Barre, Pa.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.
Whitcomb Locomotive Co., Rochelle, Ill.

LOUVERS

Burt Mfg. Company, The, 400 S. High St., Akron 11, O.

LOW TEMPERATURE STORAGE EQUIPMENT

Motor Products Corp., Deep Freeze Div., 2309-7 Davis St., N. Chicago, Ill.

LUBRICANTS (Drawing)

Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Kondor Products Corp., West Clifton Blvd. at Sloane, Cleveland 7, O.
New York & New Jersey Lubricant Co., 292 Madison Ave., New York 17, N. Y.
Penola, Inc., 34th & Smallman Sts., Pittsburgh 1, Pa.
Richards, G. Whitfield, 1738 Carlton St., Philadelphia 2, Pa.
Shell Oil Co., Inc., 50 W. 50th St., New York 20, N. Y.

LUBRICANTS (Graphite)

United States Graphite Co., The, Saginaw, Mich.

LUBRICANTS (Industrial)

Cities Service Oil Company, 60 Wall St., New York 5, N. Y.
Dow Corning Corp., P. O. Box 592, Midland, Mich.
Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa.
Hood Refining Co., N. Hamilton Ave., Greensburg, Pa.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Kondor Products Corp., West Clifton Blvd. at Sloane, Cleveland 7, O.
Lubriplate Div., Fiske Bros. Refining Co., Newark 5, N. J., Toledo 3, O.
National Refining Co., The, Hanna Bldg., Cleveland 15, O.
New York & New Jersey Lubricant Co., 292 Madison Ave., New York 17, N. Y.
Penola, Incorporated, 34th & Smallman Sts., Pittsburgh 1, Pa.
Shell Oil Co., Inc., 50 W. 50th St., New York 20, N. Y.
Sinclair Refining Co., Inc., 630 Fifth Ave., New York 20, N. Y.
Socony-Vacuum Oil Co., Inc., 26 Broadway, New York 4, N. Y.
Stewart-Warner Corp., Alemite Div., 1879 W. Diversey Blvd., Chicago 14, Ill.
Stuart, D. A., Oil Co., Ltd., 2733 S. Troy St., Chicago 23, Ill.
Sun Oil Co., Dept. 1, 1608 Walnut St., Philadelphia 3, Pa.
Texas Co., The, 135 East 42nd St., New York 17, N. Y.
Tide Water Associated Oil Co., 17 Battery Place, New York 4, N. Y.

LUBRICATING DEVICES

Blaw-Knox Lubricators Div., Blawknox, Pa.
Farval Corp., The, 3270 E. 80th St., Cleveland 4, O.
Gits Brothers Mfg. Co., 1836 S. Kilbourn Ave., Chicago 23, Ill.
Trabon Engineering Corp., 1818 E. 40th St., Cleveland 3, O.

LUBRICATING SYSTEMS

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Farval Corp., The, 3270 E. 80th St., Cleveland 4. O.
Stewart-Warner Corp., Alemite Div., 1879 W. Diversey Blvd., Chicago 14, Ill.
Trabon Engineering Corp., 1818 E. 40th St., Cleveland 3, O.

LUGS (Terminal)

Calumet and Hecla Consolidated Copper Co., Wolverine Tube Div., 1439 Central Ave., Detroit 9, Mich.

LUMBER (Flask or Pattern)

Morgan Lumber Sales Co., 8 E. Long St., Columbus, O.

MACHINE WORK

Ace Mfg. Corp., 1211 E. Erie Ave., Philadelphia 24, Pa.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Metal Products Co., 5959 Linsdale Ave., Detroit 4, Mich.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Commercial Iron Works, P. O. Box 2230, Portland 14, Oreg.
Continental Foundry & Machine Co., E. Chicago, Ind.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
Federal Shipbuilding & Dry Dock Co., Kearny, N. J.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Joyce Machine Co., 2080 Wheatsheaf Lane, Philadelphia 24, Pa.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Lewthwaite, T. H., Machine Co., Inc., 311 E. 47th St., New York 17, N. Y.
Morgan Engineering Co., The Alliance, O.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Scaife Co., Ann St., Oakmont Pa.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.

MACHINERY (Automatic Transfer Processing)

Greenlee Bros. & Co., 1927 Mason Ave., Rockford, Ill.

MACHINERY (Die-Casting)

Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Lester-Phoenix, Inc., 2629 Church Ave., Cleveland 13, O.

MACHINERY (Flexible Shaft)—See FLEXIBLE SHAFT MACHINERY

MACHINERY (Lithographing)

Wagner Litho Machinery Co., Hoboken, N. J.

MACHINERY (Plastic Molding)

Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Lester-Phoenix, Inc., 2629 Church Ave., Cleveland 13, O.
Standard Products Co., The, 503 Boulevard Bldg., Detroit 2, Mich.

MACHINERY (Special)

Acme Aluminum Alloys Inc., 232 Findlay St., Dayton 3, O.
Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Alliance Machine Co., The, Alliance, O.
American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Atlas Tool & Designing Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Beatty Machine & Mfg. Co., Hammond, Ind.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Brandt, Charles T., Inc., 1702 Ridgely St., Baltimore 30, Md.
Brosius, Edgar E., Co., Sharpsburg P. O., Pittsburgh 15, Pa.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Continental Machines, Inc., 1324 Washington Ave., Minneapolis 4, Minn.
Continental Foundry & Machine Co., E. Chicago, Ind.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Foote Bros. Gear & Machine Co., 5225 S. Western Blvd., Chicago 9, Ill.
Greenlee Bros. & Co., 1927 Mason Ave., Rockford, Ill.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Hydraulic Machinery, Inc., 12825 Ford Rd., Dearborn, Mich.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Joyce Machine Co., 2080 Wheatsheaf Lane, Philadelphia 24, Pa.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Moline Tool Co., 102 20th St., Moline, Ill.
Morgan Engineering Co., The Alliance, O.
National Broach & Machine Co., 5600 St. Jean, Detroit 13, Mich.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Oil Well Supply Co., Dallas 1, Texas.
Paxson Machine Co., Salem, O.
Safety Grinding Wheel & Machine Co., P. O. Box 746, Springfield, O.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.
Shuster, F. B., Mfg. Co., Inc., The, New Haven 9, Conn.
Simmons Machine Tool Corp., 1755 N. Broadway, Albany 1, N. Y.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.
Steel Products Engineering Co., 1205 W. Columbia St., Springfield, O.
Stokerunit Corp., 4548 W. Mitchell St., Milwaukee 14, Wis.
Struthers Wells Corp., Titusville, Pa.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
United Engineering & Fdry Co., First National Bank Bldg., Pittsburgh 22, Pa.
U. S. Automatic Corp., Amherst, O.
Wagner Litho Machinery Co., Hoboken, N. J.
Wean Engineering Co., Inc., The, Warren, O.
Wood, R. D., Co., 400 Chestnut St., Philadelphia 5, Pa.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.
Youngstown Welding & Eng. Co. The, 3711 Oakwood Ave., Youngstown 9, O.
Vinco Corp., Schaefer and Joy Rds., Detroit 27, Mich.

MACHINERY (Used & Rebuilt)

Albert, L. & Son, Whitehead Rd., Trenton, N. J.
Dulien Steel Products, Inc., 414 First Ave., So., Seattle, Wash.
General Blower Co., 404 N. Peoria St., Chicago 22, Ill.
Iron & Steel Products, Inc., Hegewisch Sta., Chicago 33, Ill.
Sonken-Galamba Corp., 108 N. 2nd St., Kansas City, Kansas
Simmons Machine Tool Corp., 1755 N. Broadway, Albany 1, N. Y.
West Penn Machinery Co., 1208 House Bldg., Pittsburgh 22, Pa.

MACHINERY (Vending)

Gerding Bros., 5 E. Third St., Cincinnati 2, O.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.

MACHINERY (WELDING WIRE)

Shuster, F. B., Mfg. Co., Inc., The New Haven 9, Conn.

MACHINES (Marking)

Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

MACHINES (Photocopying)

American Photocopy Equipment Co., 2849 N. Clark St., Chicago 14, Ill.
Ozalid Products Div., General Aniline & Film Corp., Johnson City, N. Y.

MAGNESIA (Electrically Fused)

Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Norton Co., Worcester 6, Mass.

MAGNESIA-REFRACTORIES—See REFRACTORIES (Magnesia)

MAGNESIUM

Dow Chemical Co., The, Midland, Mich.

MAGNETIC SEPARATORS—See SEPARATORS (Magnetic)

MAGNETS (Lifting)

Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Ohio Electric Mfg. Co., The, 5906 Maurice Ave., Cleveland 4, O.

MAGNETS (Separating)

Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Ohio Electric Mfg. Co., The, 5906 Maurice Ave., Cleveland 4, O.

MANDRELS (Expanding)

Lee, K. O., Company, Aberdeen, S. Dak.

MANGANESE METAL AND ALLOYS

Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Taylor-Wharton Iron & Steel Co., Easton, Pa.

MANGANESE ORE

Samuel, Frank & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

MANIFOLDS (Cylinder)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

MANIPULATORS

Alliance Machine Co., The, Alliance, O.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Brosius, Edgar E., Co., Sharpsburg P. O., Pittsburgh 15, Pa.
Continental Foundry & Machine Co., E. Chicago, Ind.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.

MARKING DEVICES

American Crayon Co., Sandusky, O.
Cunningham, M. E., Co., 172 E. Carson St., Pittsburgh 19, Pa.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

MATS and MATTING (Wire)

Buffalo Wire Works Co., Inc., 437 Terrace Rd., Buffalo 2, N. Y.

METAL (Perforated)—See PERFORATED METAL

METAL CLEANERS

American Chemical Paint Co., Ambler, Pa.
Detrex Corporation, 13029 Hillview Ave., Detroit 4, Mich.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Holden, A. F., Co., The, P.O. Box 1898, New Haven 8, Conn.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Kondor Products Corp., West Clifton Blvd. at Sloane, Cleveland 7, O.
Pennsylvania Salt Mfg. Co., Dept. S Pennsalt Cleaner Div., Philadelphia 7, Pa.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

METAL CLEANING MACHINES

American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Brandt, Charles T., Inc., 1702 Ridgley St., Baltimore 30, Md.
Bullard Co., The, Bridgeport 2, Conn.
Detrex Corporation, 13029 Hillview Ave., Detroit 4, Mich.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Pangborn Corporation, Hagerstown, Md.
Ransohoff, N., Inc., 1317 Township Ave., Cincinnati 16, O.
Salem Engineering Co., 714 S. Broadway, Salem, O.

METAL DISINTEGRATOR

Clinton Machine Co., Clinton, Mich.

METAL DUPLICATION (Without Dies)

O'Neil-Irwin Mfg. Co., 304 8th Ave., So., Minneapolis 15, Minn.

METAL FINISHES

American Chemical Paint Co., Ambler, Pa.

METAL POWDERS—See POWDERS, (Metal)

METAL SPRAYING EQUIPMENT AND SUPPLIES

Metallizing Co. of America, 1330 W. Congress St., Chicago 7, Ill.

METAL WASHING EQUIPMENT

American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.

METALS (Nonferrous)

Ajax Metal Co., Philadelphia 43, Pa.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Brass Co., The, Waterbury 88, Conn. Milwaukee 4, Wis.
Ampco Metal Inc., Dept. S8, Milwaukee 4, Wis.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Bridgeport Brass Co., Bridgeport, Conn.
Bunting Brass & Bronze Co., The, 715 Spencer St., Toledo 1, O.
Cadman, A. W. Mfg. Co., 28th & Smallman Sts., Pittsburgh 22, Pa.
Copperweld Steel Co., Warren, O.
Dow Chemical Co., The, Midland, Mich.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
Harper, The, H. M. Co., 2646 Fletcher St., Chicago 18, Ill.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.
Revere Copper & Brass Inc., 230 Park Ave., New York 17, N. Y.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.
Western Brass Mills, Div. of Olin Industries, East Alton, Ill.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

METALS (Nonferrous—Corrosion & Abrasive Resistant)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Haynes Stellite Co., 30 E. 42nd St., New York 17, N. Y.
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

METALS (Prefinished)

American Nickeloid Co., 1310 Second St., Peru, Ill.

METALS (Silver Clad)

Mallory, P. R., & Co., Inc.,
Handy & Harman, 82 Fulton St., New York 7, N. Y.
3029 E. Washington St., Indianapolis 6, Ind.

MICROMETERS

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Scherr, George, Co., 202 Lafayette St., New York 12, N. Y.

MILLING CUTTERS

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Cowles Tool Co., 2086 W. 110th St., Cleveland 2, O.
Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Haynes Stellite Co., 30 E. 42nd St., New York 17, N. Y.
Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.

MILLING CUTTERS (Con.)

Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.
Plan-O-Mill Corp., 1511 E. Eight Mile Rd., Hazel Park, Mich.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Spe-D-Cut Tool Co., 9th & Lyons Sts., Hannibal, Mo.

MILLING CUTTER (Carbide Tipped)

Continental Tool Works Div. of Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Cowles Tool Co., 2086 W. 110th St., Cleveland 2, O.
Firth Sterling Steel Co., McKeesport, Pa.
Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Plan-O-Mill Corp., 1511 E. Eight Mile Rd., Hazel Park, Mich.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Spe-D-Cut Tool Co., 9th & Lyons Sts., Hannibal, Mo.
Tungsten Carbide Tool Co., Div. of Michigan Tool Co., Detroit, Mich.
Tung-Tip Tools Div., Lowell & Grayson, Monrovia, Cal.

MILLING MACHINE ATTACHMENTS

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cincinnati Milling Machine Co., Cincinnati 9, O.
Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis.

MILLING MACHINES

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cincinnati Milling Machine Co., Cincinnati 9, O.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee. Wis.
Moline Tool Co., 102 20th St., Moline, Ill.
National Broach & Machine Co., 5600 St. Jean, Detroit 13, Mich.
Nichols, W. H., and Sons, 48 Woerd Ave., Waltham 54, Mass.
Plan-O-Mill Corp., 1511 E. Eight Mile Rd., Hazel Park, Mich.
Simmons Machine Tool Corp., 1755 N. Broadway, Albany 1, N. Y.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich
Stokerunit Corp., 4548 W. Mitchell St., Milwaukee 14, Wis.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.

MILLING MACHINES (Milling and Centering Combined)

Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Jones & Lamson Machine Co., Springfield, Vt.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.

MILLS (Blooming, Universal, Plate, Sheet, Tin, Bar, Strip, Etc.)—See ROLLING MILL EQUIPMENT

MIXERS (Hot Metal)

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.

MIXING EQUIPMENT

Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.

MOLD PLUGS

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.

MOLDS (Ingot)—See INGOT MOLDS

MOLYBDENUM

Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
Molybdenum Corp. of America, Grant Bldg., Pittsburgh 19, Pa.

MONEL METAL (All Commercial Forms)

International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.

MONORAIL SYSTEMS

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283 St., Wickliffe, O.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

MOTION PICTURE EQUIPMENT

Eastman Kodak Co., 343 State St., Rochester 4, N. Y.

MOTOR CONTROLS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

MOTOR-GENERATORS

Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
Kato Engineering Co., Mankato, Minn.

MOTOR-ROLLERS

Schloemann Engineering Corp., 1105 Empire Bldg., Pittsburgh 22, Pa.

MOTORS (Electric)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Century Electric Co., 1806 Pine St., St. Louis 3, Mo.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
Delta Mfg. Co., The, 703N E. Vienna Ave., Milwaukee 1, Wis.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
General Electric Co., Schenectady 5, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Lincoln Electric Co., The, Cleveland 1, O.
Master Electric Co., The, 100 Davis Ave., Dayton 1, O.
Reliance Electric & Eng. Co., 1088 Ivanhoe Rd., Cleveland 10, O.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.
Wesche, B. A., Electric Co., The, 1628 Vine St., Cincinnati 10, O.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

MOTORS (Electric, Rebuilt)

Guyan Machinery Co., Logan, W. Va.

MOUNTINGS (Rubber)

Goodrich, B. F., Co., The, Akron 19, O.
Harris Products Co., 5105 Cowan Ave., Cleveland 4, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

MUCK BAR

Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

MUFFLERS (Spark Arresting)

Donaldson Co., Inc., 666 Pe.ham St., St. Paul 4, Minn.

NAILS (*Also Stainless)

Alan Wood Steel Co., Conshohocken, Pa.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
*Columbia Steel Co., San Francisco 6, Cal.
Continental Steel Corp., Kokomo, Ind.
Grammes, L. F., & Sons, Inc., Allentown, Pa.
*Hassall, John, Inc., 402 Oakland St., Brooklyn 22, N. Y.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
*Republic Steel Corp., Dept. ST, Cleveland 4, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Wickwire Brothers, Inc., 189 Main St., Cortland, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

NAILS (Coated & Galvanized)

Alan Wood Steel Co., Conshohocken, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
Wickwire Brothers, Inc., 189 Main St., Cortland, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

NAME PLATES

Grammes, L. F., & Sons, Inc., Allentown, Pa.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

NETTING (Wire)

Buffalo Wire Works Co., Inc., 437 Terrace Rd., Buffalo 2, N. Y.

NIBBLING MACHINES

Andrew C. Campbell Div., American Chain & Cable Co., Inc., Brideport 2, Conn.

NICKEL (All Commercial Forms)

International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.

NITRIDING

Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Nitralloy Corp., The, 230 Park Ave., New York 17, N. Y.
Pittsburgh Commercial Heat Treating Co., 49th St. & A.V.R.R., Pittsburgh 1, Pa.

NOZZLES

Aidrich Pump Co., The 8 Pine St., Allentown, Pa.
American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.

NUTS (*Also Stainless)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Bethlehem Steel Co., Bethlehem, Pa
Boss Bolt & Nut Co., Div. of The Lock Nut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Cleveland Cap Screw Co., The, 2935 E. 79th St., Cleveland 4, O
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
*Harper, H. M. Co., The, 2646 Fletcher St., Chicago 18, Ill.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mas.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
*National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
*Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
*Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Tinnerman Products, Inc., 2039 Fulton Rd., Cleveland 13, O.
Triplex Screw Co., 5341 Grant Ave., Cleveland 5, O.

NUTS (Acorn or Cap)

Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Harper Co., H. M., The, 2646 Fletcher St., Chicago 18, Ill.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
U. S. Automatic Corp., Amherst, O.

NUTS (Castellated)

Bethlehem Steel Co., Bethlehem, Pa.
Chicago Screw Company, The, 1026 S. Homan Ave., Chicago 24, Ill.
Cleveland Cap Screw Co., 2935 E. 79th St., Cleveland 4, O.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Acme Co., The, 170 E. 131 St., Cleveland 8, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
U. S. Automatic Corp., Amherst, O.

NUTS (Machine Screw)

Boss Bolt & Nut Co., Div. of The Lock Nut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
U. S. Automatic Corp., Amherst, O.

NUTS (Nonferrous)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Chicago Screw Company, The, 1026 S. Homan Ave., Chicago 24, Ill.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
U. S. Automatic Corp., Amherst, O.

NUTS (Self Locking)

Adel Precision Products Corp., 10345 Van Owen St., Burbank, Cal.
Bethlehem Steel Co., Bethlehem, Pa.
Boss Bolt & Nut Co., Div. of The Lock Nut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Tinnerman Products, Inc., 2039 Fulton Rd., Cleveland 13, O.

NUTS (Semi-finished)

Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Chicago Screw Company, The, 1026 S. Homan Ave., Chicago 24, Ill.
Cleveland Cap Screw Co., 2935 E. 79th St., Cleveland 4, O.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS (Spring—Tension)

Adel Precision Products Corp., 10345 Van Owen St., Burbank, Cal.
Tinnerman Products, Inc., 2039 Fulton Rd., Cleveland 13, O.

NUTS (Wing)

National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Parker-Kalon Corp., 194-200 Varick St., New York 14, N. Y.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

OFFICE EQUIPMENT

Remington-Rand Inc., Systems Div., 415 Fourth Ave., New York 10, N. Y.
United Autographic Register Co., 5000 S. California Ave., Chicago 32, Ill.

OIL CUPS

Gits Brothers Mfg. Co., 1836 S. Kilbourn Ave., Chicago 23, Ill.

OIL SEALS

Chicago Rawhide Mfg. Co., 1308 Elston Ave., Chicago 22, Ill.
Gits Brothers Mfg. Co., 1836 S. Kilbourn Ave., Chicago 23, Ill.
Syntron Co., 370 Lexington Ave., Homer City, Pa.

OILS (Compressor)

Cities Service Co., 60 Wall St., New York 5, N. Y.
Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa.
Hood Refining Co., N. Hamilton Ave., Greensburg, Pa.
Shell Oil Co., Inc., 50 W. 50th St., New York 20, N. Y.
Sinclair Refining Co., Inc., 630 Fifth Ave., New York 20, N. Y.
Socony-Vacuum Oil Co., Inc., 26 Broadway, New York 4, N. Y.
Texas Co., The, 135 East 42nd St., New York 17, N. Y.

OILS (Cutting)

Cities Service Oil Company, 60 Wall St., New York 5, N. Y.
DoAll Company, The, 231 N. Laurel Ave., Des Plaines, Ill.
Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
National Refining Co., The, Hanna Bldg., Cleveland 15, O.
Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.
Penola, Incorporated, 34th & Smallman Sts., Pittsburgh 1, Pa.
Richards, G. Whitfield, 1738 Carlton St., Philadelphia 2, Pa.
Shell Oil Co., Inc., 50 W. 50th St., New York 20, N. Y.
Sinclair Refining Co., Inc., 630 Fifth Ave., New York 20, N. Y.
Socony-Vacuum Oil Co., Inc., 26 Broadway, New York 4, N. Y.
Stuart, D. A., Oil Co., Ltd., 2733 S. Troy St., Chicago 23, Ill.
Sun Oil Co., Dept. 1, 1608 Walnut St., Philadelphia 3, Pa.
Texas Co., The, 135 East 42nd St., New York 17, N. Y.
Tide Water Associated Oil Co., 17 Battery Place, New York 4, N. Y.

OILS (Lubricating)—See LUBRICANTS (Industrial)

OILS (Quenching)

Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Stuart, D. A., Oil Co., Ltd., 2733 S. Troy St., Chicago 23, Ill.

OPEN-HEARTH FURNACES—See FURNACES (Open-Hearth)

OVENS (Annealing, Japanning, Tempering)

Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
Hagan, George J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Hall, C. M., Lamp Co., 1005 E. Hancock St., Detroit 7, Mich.
Industrial Oven Engineering Co., The 11621 Detroit Ave., Cleveland 2, O.
Maehler, Paul, Co., The, 2208 W. Lake St., Chicago 12, Ill.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Mahr Mfg. Co., Div. of Diamond Iron Works Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Tate-Jones & Co., Inc., Leetsdale, Pa.

OVENS (Baking & Drying)

Brandt, Charles T., Inc., 1702 Ridgley St., Baltimore 30, Md.
Fostoria Pressed Steel Corp., The, Fostoria, O.
Hall, C. M., Lamp Co., 1005 E. Hancock St., Detroit 7, Mich.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.
Tate-Jones & Co., Inc., Leetsdale, Pa.
Wagner Litho Machinery Co., Hoboken, N. J.

OVENS (Coke, By-Product)

Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

OVENS (Core and Mold)

Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn
Hall, C. M., Lamp Co., 1005 E. Hancock St., Detroit 7, Mich.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Maehler, Paul, Co., The, 2208 W. Lake St., Chicago 12, Ill.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Mahr Mfg. Co., Div. of Diamond Iron Works Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Tate-Jones & Co., Inc., Leetsdale, Pa.

OVENS (Gas or Oil Heat)

Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Maehler, Paul, Co., The, 2208 W. Lake St., Chicago 12, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Tate-Jones & Co., Inc., Leetsdale, Pa.

OXY-ACETYLENE WELDING AND CUTTING—See WELDING

OXYGEN

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.

PACKING (Asbestos or Rubber)

Goodrich, B. F., Co., The, Akron 19, O.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Union Asbestos & Rubber Co., 1821 S. 54th Ave., Cicero 50, Ill.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

PACKING (Carbon or Graphite)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.

PACKINGS (Mechanical Leather)

Chicago Rawhide Mfg. Co., 1308 Elston Ave., Chicago 22, Ill.
Graton & Knight Co., 322 Franklin St., Worcester 4, Mass.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

PACKAGING (Protective)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

PAINT (Alkali Resisting)

Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.

PAINT (Aluminum)

Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.
Koppers Co., Tar & Chemical Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

PAINT (Aluminum Pigment)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

PAINT (Heat Resisting, Rust Preventing, Priming)

Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.
American Chemical Paint Co., Ambler, Pa.
Koppers Co., Tar & Chemical Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.

PAINTS, LACQUERS and VARNISHES (Industrial)

Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.
Dow Corning Corp., P. O. Box 592, Midland, Mich.
National Lead Co., 111 Broadway, New York 6, N. Y.
Pittsburgh Plate Glass Co., Paint Div., 632 Duquesne Way, Pittsburgh 22, Pa.
Standard Varnish Works, 2600 Richmond Terrace Staten Island 3, N. Y.

PAINT (Marking)

American Crayon Co., Sandusky, O.
Koppers Co., Tar & Chemical Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Markal Company, 631 N. Western Ave., Chicago 12, Ill.

PAINT (Stick Form)

American Crayon Co., Sandusky, O.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

PAINTING

Hanlon-Gregory Galvanizing Co., 5515 Butler St., Pittsburgh 1, Pa.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.

PAPER (Reinforced)

Sisalkraft Co., The, 205 W. Wacker Drive, Chicago 6, Ill.

PAPER (Sensitized Photocopying)

American Photocopy Equipment Co., 2849 N. Clark St., Chicago 14, Ill.
Eastman Kodak Co., 343 State St., Rochester 4, N. Y.
Ozalid Products Div., General Aniline & Film Corp., Johnson City, N. Y.

PAPER (Waterproof)

Sisalkraft Co., The, 205 W. Wacker Drive, Chicago 6, Ill.

PAPER (Wrapping—Fibre Reinforced)

Sisalkraft Co., The, 205 W. Wacker Drive, Chicago 6, Ill.

PARTITIONS (Wire)

Buffalo Wire Works Co., Inc., 437 Terrace Rd., Buffalo 2, N. Y.

PARTS (Precision)

Atlas Tool & Designing Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Bone Tool & Gauge Co., 9910 Freeland Ave., Detroit 27, Mich.
Brandt, Charles T., Inc., 1702 Ridgley St., Baltimore 30, Md.
Burgess-Norton Mfg. Co., 778 Peyton St., Geneva, Ill.
Chicago Screw Company, The, 1026 S. Homan Ave., Chicago 24, Ill.
Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
Joyce Machine Co., 2080 Wheatsheaf Lane, Philadelphia 24, Pa.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.
Redford Engineering Co., 21200 E. 8 Mile Rd., Detroit 19, Mich.

PARTS (Precision-Diesel)

Aircraft & Diesel Equipment Corp., 4401 N. Ravenswood Ave., Chicago 40, Ill.
Chicago Screw Company, The, 1026 S. Homan Ave., Chicago 24, Ill.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.

PATTERNS (Wood or Metal)

Acme Aluminum Alloys Inc., 232 Findlay St., Dayton 3, O.
Hedstrom, Oscar W., Corp., 4824 W. Division St., Chicago 51, Ill.
Wellman Bronze & Aluminum Co., The, 2539 E. 93 St., Cleveland 4, O.

PERFORATED METAL

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Chicago Perforating Co., 2443 W. 24th Pl., Chicago 8, Ill.
Diamond Mfg Co., Wyoming, Pa
Erdle Perforating Co., 171 York St., Rochester 11, N. Y.
Harrington & King Perforating Co., 5634 Fillmore St., Chicago 44, Ill.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.

PHENOL RECOVERY PLANTS

Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

PHOSPHOR BRONZE—See METALS (Nonferrous)

PHOTO TEMPLATE EQUIPMENT

Eastman Kodak Co., 343 State St., Rochester 4, N. Y.

PHOTOGRAPHIC EQUIPMENT AND SUPPLIES

Eastman Kodak Co., 343 State St., Rochester 4, N. Y.

PHOTOGRAPHIC LIGHTING EQUIPMENT

Bardwell & McAlister, Inc., P. O. Box 1310, Hollywood 28, Cal.

PICKERS (Vacuum and Mechanical)

Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13, Ill.

PICKLING

Hanlon-Gregory Galvanizing Co., 5515 Butler St., Pittsburgh 1, Pa.

PICKLING COMPOUNDS

American Chemical Paint Co., Ambler, Pa.
American Zinc, Lead & Smelting Co., 943 Paul Brown Bldg., St. Louis 1, Mo.
Cleveland Cliffs Iron Co., The, Union Commerce Bldg., Cleveland 14, O.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.

PICKLING EQUIPMENT

Buffalo Wire Works Co., Inc., 437 Terrace Rd., Buffalo 2, N. Y.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Meaker Co., The, 1835 S. 55th Ave., Chicago 50, Ill.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Ransohoff, N., Inc., 1317 Township Ave., Cincinnati 16, O.
Rolock, Inc., 1380 Kings Highway, Fairfield, Conn.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Youngstown Welding & Eng. Co., 3711 Oakwood Ave., Youngstown 9, O.

PICKLING MACHINERY

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Erie Foundry Co., Erie, Pa.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Wean Engineering Co., Inc., The, Warren, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

PICKLING TANK LININGS

Ceilcote Co., 750 Rockefeller Bldg., Cleveland 13, O.
Goodrich, B. F., Co., The, Akron 19, O.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

PICKLING TANK LININGS (Con.)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
National Lead Co., 111 Broadway, New York 6, N. Y.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

PICKLING TANKS—See TANKS (Pickling)

PIG CASTING MACHINES

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.

PIG IRON

Alan Wood Steel Co., Conshohocken, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Brooke, E. & G., Iron Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Cleveland-Cliffs Iron Co., The, Union Commerce Bldg., Cleveland 14, O.
Hanna Furnace Corp., The, Penobscot Bldg., Detroit 26, Mich.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Pickands Mather & Co., Union Commerce Bldg., Cleveland 14, O.
Republic Steel Corp., Dept. S1, Cleveland 4, O.
Samuel, Frank & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.
Shenango Furnace Co., Oliver Bldg., Pittsburgh 22, Pa.
Snyder, W. P., & Co., Oliver Bldg., Pittsburgh 22, Pa.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.

PIG IRON (Silvery)

Jackson Iron & Steel Co., Jackson, O.

PILING (Iron and Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept ST, Cleveland 4, O.

PILING (Pipe)

American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

PILING (Pressure-Treated Wood)

Koppers Co., Wood Preserving Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

PILLOW BLOCKS (Anti-Friction)

Dodge Manufacturing Corp., Mishawaka, Ind.
Link-Belt Co., 519 N. Holmes Ave., Indianapolis 6, Ind.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
SKF Industries, Inc., Front St. & Erie Ave., Philadelphia 34, Pa.

PILLOW BOXES

Norma-Hoffmann Bearings Corp., Stamford, Conn.

PINIONS (Mill)

Bethlehem Steel Co., Bethlehem, Pa.
Continental Foundry & Machine Co., E. Chicago, Ind.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
Lewis Fdry. & Mach. Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.
United Engineering & Foundry Co., First National Bank Bldg., Pittsburgh 22, Pa.

PINS (Case Hardened or Heat Treated)

Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
U. S. Automatic Corp., Amherst, O.

PINS (Piston)

Burgess-Norton Mfg. Co., 778 Peyton St., Geneva, Ill.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.

PINS (Taper)

Chicago Screw Company, The, 1026 S. Homan Ave., Chicago 24, Ill.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.
Moltrup Steel Products Co., Beaver Falls, Pa.
U. S. Automatic Corp., Amherst, O.

PIPE (Alloy) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Brackenridge, Pa.
*Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.
*Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

PIPE (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Dow Chemical Co., The, Midland, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

PIPE (Brass, Bronze or Copper)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Revere Copper & Brass Co., Inc., 230 Park Ave., New York 17, N. Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.

PIPE (Cement Lined)

National Tube Co., Frick Bldg., Pittsburgh 30, Pa.

PIPE (Lead or Lead Lined)

National Lead Co., 111 Broadway, New York 6, N. Y.

PIPE (Non-Metallic)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.

PIPE (Rubber Lined)

Goodrich, B. F., Co., The, Akron 19, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

PIPE (Square and Rectangular)

Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
Drake Steel Supply Co., 10660 S. Alameda St., Los Angeles 2, Cal.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

PIPE (Steel)

Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa
Columbia Steel Co., San Francisco 6, Calif.
Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Drake Steel Supply Co., 10660 S Alameda St., Los Angeles 2, Cal
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Wheeling Steel Corp., Wheeling W. Va.
Youngstown Sheet & Tube Co., The Youngstown 1, O.

PIPE (Steel, Fabricated)

Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Power Piping Div. of Blaw-Knox Co., Beaver & Western Ave., Pittsburgh 2, Pa.

PIPE BENDING

Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Power Piping Div. of Blaw-Knox Co., Beaver & Western Ave., Pittsburgh 2, Pa.

PIPE and TUBE BENDING MACHINES

American Pipe Bending Machine Co., Inc., 11 Furnace St., Poultney, Vt.
Pines Engineering Co., 600 Prairie St., Aurora, Ill.

PIPE COUPLINGS

Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.

PIPE CUTTING AND THREADING MACHINERY

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Landis Machine Co., Waynesboro, Pa.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.
Murchey Machine & Tool Co., 951 Porter St., Dept. L, Detroit 26, Mich.
Pines Engineering Co., 600 Prairie St., Aurora, Ill.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.

PIPE FITTINGS

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.
Watson-Stillman Co., Roselle, N. J.

PIPE LINES (Riveted or Welded)

Bethlehem Steel Co., Bethlehem, Pa.
Brandt, Charles T., Inc., 1702 Ridgley St., Baltimore 30, Md.

PIPE MACHINING EQUIPMENT

Pines Engineering Co., 600 Prairie St., Aurora, Ill.

PIPE MILL MACHINERY

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

PIPE STRAIGHTENING MACHINERY

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.

PIPE TOOLS

Clark, Robert H., Co., 9330 Santa Monica Blvd., Beverly Hills, Cal.
Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Oster Mfg. Co., The, 2037 E. 61st., Cleveland 3, O.
Pines Engineering Co., 600 Prairie St., Aurora, Ill.

PIPING CONTRACTORS

Power Piping, Div. of Blaw-Knox Co., Beaver and Western Ave., Pittsburgh 2, Pa.

PISTON RINGS

American Hammered Piston Ring Div., Koppers Co., Baltimore 3, Md.

PISTON RODS

Bliss & Laughlin, Inc., Harvey, Ill.
Finkl, A., & Sons Co., 2011 N. Southport Ave., Chicago 14, Ill.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Union Drawn Steel Div., Republic Steel Corp., Massillon, O.
Wyckoff Steel Co., P.O. Box 1256, Pittsburgh 30, Pa.

PISTONS (Aluminum, Grey Iron)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.
Permold Co., The, 830 W. Liberty St., Medina, O.
Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.

PLANERS

Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Rockford Machine Tool Co., 2400 Kishwaukee St., Rockford, Ill.
Simmons Machine Tool Corp., 1755 N. Broadway, Albany 1, N. Y.

PLANT DISMANTLERS

Hetz Construction Co., Warren, O.

PLATE CASTORS

Hyatt Bearings Div., General Motors Corp., Harrison, N. J.

PLATE PRESSING (Heavy)

Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Parish Pressed Steel Co., Reading, Pa.

PLATES (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Dow Chemical Co., The, Midland, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

PLATES (Sheared or Universal) (*Also Stainless)

*Alan Wood Steel Co., Conshohocken, Pa.
*Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
American Petrometal Corp., Broadway at 11th St., Long Island City 2, N. Y.
*American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
Benedict-Miller Inc., 216 Clifford St., Newark 5, N. J.
*Bethlehem Steel Co., Bethlehem, Pa.
*Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Columbia Steel Co., San Francisco 6, Calif.

PLATES (Sheared or Universal) (*Also Stainless) (Con.)

Enterprise Galvanizing Co., 3525 E. Cumberland St., Philadelphia 25, Pa.
Granite City Steel Co., Granite City, Ill.
Holliday, W. J., & Co., Hammond, Ind.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
*Republic Steel Corp., Dept. ST, Cleveland 4, O.
*Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
*United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Worth Steel Co., Claymont, Del.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

PLATES (Stainless Clad)

Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
Granite City Steel Co., Granite City, Ill.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.

PLATES (Steel—Floor)—See FLOORING (Steel)

PLATES (Terne and Tin)—See TIN or TERNE PLATE

PLATING EQUIPMENT

Brandt, Charles T., Inc., 1702 Ridgley St., Baltimore 30, Md.
Chicago Wheel & Mfg. Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
Hall, C. M., Lamp Co., 1005 E. Hancock St., Detroit 7, Mich.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Heil Engineering Co., 12903 Elmwood Ave., Cleveland 11, O.
Meaker Co., The, 1635 S. 55th Ave., Chicago 50, Ill.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

PLATING SUPPLIES

Hanson-Van Winkle-Munning Co., Matawan, N. J.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.
United Chromium, Inc., 51 E. 42nd St., New York 17, N. Y.

PLUGS (Expansion)

Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
Master Products Co., 6400 Park Ave., Cleveland 5, O.
Wrought Washer Mfg. Co., 2103 S. Bay St., Milwaukee 7, Wis.

POLE LINE MATERIAL

Bethlehem Steel Co., Bethlehem, Pa.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.

POLES (Tubular Steel)

National Tube Co., Frick Bldg., Pittsburgh 30, Pa.

PORTABLE TOOLS AND ACCESSORIES

Chicago Wheel & Manufacturing Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Lewthwaite, T. H., Machine Co., Inc., 311 E. 47th St., New York 17, N. Y.
Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.
Syntron Co., 370 Lexington Ave., Homer City, Pa.

POTENTIOMETERS

Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.

POTS (Annealing-Wire)

National Annealing Box Co., Washington, Pa.

POTS (Case Hardening)

Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Rolock, Inc., 1380 Kings Highway, Fairfield, Conn.
Tate-Jones & Co., Inc., Leetsdale, Pa.

POTS (Melting)

Farrel-Birmingham Co., Inc., Ansonia, Conn.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore 2, Md.

POTS (Tinning)

National Annealing Box Co., Washington, Pa.

POWDERS, METAL (Iron, Lead, Copper)

Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

POWDERED METAL PRODUCTS

Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.
Moraine Products Div., General Motors Corp., Dayton 1, O.

POWER PLANTS (Diesel, Gas Engine, Steam)

Ready-Power Co., The, 3842 Grand River Ave., Detroit 8, Mich.

POWER UNITS (Gasoline, Electric, for Industrial Trucks)

Ready-Power Co., The, 3842 Grand River Ave., Detroit 8, Mich.

PREHEATERS

Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Fostoria Pressed Steel Corp., The, Fostoria, O.
Hall, C. M., Lamp Co., 1005 E. Hancock St., Detroit 7, Mich.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Tate-Jones & Co., Inc., Leetsdale, Pa.

PRESS BRAKES

Bliss, E. W., Co., 53rd St. & Second Ave., Brooklyn 32, N. Y.
Cincinnati Shaper Co., The, Garrard and Elam Sts., Cincinnati 25, O.
Cleveland Crane & Engineering Co., The, Steelweld Machinery Div., The, 1125 E. 283rd St., Wickliffe, O.

PRESSED METAL PARTS

American Brass Co., The, Waterbury 88, Conn.
Brandt, Charles T., Inc., 1702 Ridgley St., Baltimore 30, Md.
Mullins Mfg. Co., Warren, O.
Parish Pressed Steel Co., Reading, Pa.
Stanley Works, The, Pressed Metal Div., New Britain, Conn.
Worcester Pressed Steel Co., 508 Barber Ave., Worcester 6, Mass.

PRESSES

Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., Hammond, Ind.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Colonial Broach Co., P.O. Box No. 37, Harper Sta., Detroit 13, Mich.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Galland-Henning Manufacturing Co., 2747 S. 31st St., Milwaukee 7, Wis.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Streine Tool & Mfg. Co., The, New Bremen, O.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
Tomkins-Johnson Co., The, Dept. S, 611 N. Mechanic St., Jackson, Mich.
Watson-Stillman Co., Roselle, N. J.

PRESSES (Bending)

Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., Hammond, Ind.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Bliss, E. W., Co., 53rd St. & Second Ave., Brooklyn 32, N. Y.
Cleveland Crane & Engineering Co., The, Steelweld Machinery Div., The, 1125 E. 283rd St., Wickliffe, O.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Watson-Stillman Co., Roselle, N. J.
Zeh & Hahnemann Co., 56 Avenue A, Newark 5, N. J.

PRESSES (Extrusion)

Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., Hammond, Ind.
Bliss, E. W., Co., 53rd St. & Second Ave., Brooklyn 32, N. Y.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Schloemann Engineering Corp., 1105 Empire Bldg., Pittsburgh 22, Pa.
Watson-Stillman Co., Roselle, N. J.

PRESSES (Forging)

Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Bliss, E. W., Co., 53rd St. & Second Ave., Brooklyn 32, N. Y.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Erie Foundry Co., Erie, Pa.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
National Machinery Co., The, Tiffin, O.
Schloemann Engineering Corp., 1105 Empire Bldg., Pittsburgh 22, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.

PRESSES (Forming and Braking)

Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., Hammond, Ind.
Bliss, E. W., Co., 53rd St., & Second Ave., Brooklyn 32, N. Y.
Cincinnati Shaper Co., The, Garrard and Elam Sts., Cincinnati 25, O.
Cleveland Crane & Engineering Co., The, Steelweld Machinery Div., The, 1125 E. 283rd St., Wickliffe, O.
Hydraulic Press Mfg. Co., The Mt. Gilead, O.
Zeh & Hahnemann Co., 56 Avenue A, Newark 5, N. J.

PRESSES (Hydraulic)

Air Hydraulics Div., Beyer Machine Co., Jackson, Mich.
Albert, L., & Son, Whitehead Rd., Trenton, N. J.
Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., Hammond, Ind.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Bliss, E. W., Co., 53rd St. & Second Ave., Brooklyn 32, N. Y.
Chambersburg Engineering Co., Chambersburg, Pa.
Colonial Broach Co., P.O. Box No. 37, Harper Sta., Detroit 13, Mich.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Galland-Henning Manufacturing Co., 2747 S. 31st St., Milwaukee 7, Wis.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Hydraulic Machinery, Inc., 12825 Ford Rd., Dearborn, Mich.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.
Schloemann Engineering Corp., 1105 Empire Bldg., Pittsburgh 22, Pa.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
Watson-Stillman Co., Roselle, N. J.
Wood, R. D., Co., 400 Chestnut St., Philadelphia 5, Pa.
Wright Mfg. Div. of American Chain & Cable Co., Inc., York, Pa.

PRESSES (Pneumatic)

Air Hydraulics Div., Beyer Machine Co., Jackson, Mich.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.

PRESSES (Punching, Drawing, Coining, Blanking, etc.)

Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., Hammond, Ind.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Bliss, E. W., Co., 53rd St. & Second Ave., Brooklyn 32, N. Y.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.
Zeh & Hahnemann Co., 56 Avenue A, Newark 5, N. J.

PRESSES (Riveting)

Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.

PRESSES (Stamping)

Bliss, E. W., Co., 53rd St. & Second Ave., Brooklyn 32, N. Y.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Zeh & Hahnemann Co., 56 Avenue A, Newark 5, N. J.

PRESSES, BRIQUETTING (Hydraulic)

Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Bliss, E. W., Co., 53rd St. & Second Ave., Brooklyn 32, N. Y.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.

PRESSES, BRIQUETTING, (Turnings & Borings)

Watson-Stillman Co., Roselle, N. J.

PRESSURE VESSELS

Babcock & Wilcox Co., 85 Liberty St., New York 6, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
National Annealing Box Co., Washington, Pa.
Scaife Co., Ann St., Oakmont, Pa.
Struthers Wells Corp., Titusville, Pa.

PROCESS ENGINEERING

Acme Aluminum Alloys Inc., 232 Findlay St., Dayton 3, O.
Atlas Tool & Designing Co., Castor & Kensington Aves., Philadelphia 24, Pa.

PUG MILLS

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.

PULLEYS (Magnetic)

Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.

PULVERIZERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Pulverizer Co., 1539 Macklind Ave., St. Louis 10, Mo.
Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Gruendler Crusher & Pulverizer Co., 2915-17 N. Market St., St. Louis 6, Mo.
Vulcan Iron Works, Wilkes-Barre, Pa.

PUMPS

Aldrich Pump Co., The, 8 Pine St., Allentown, Pa.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Oil Well Supply Co., Dallas 1, Tex.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Protectoseal Co., 1920 S. Western Ave., Chicago 8, Ill.
Romec Pump Co., Elyria, O.
Roper, Geo. D., Co., The, Rockford, Ill.
Weinman Pump & Supply Co., The, 207-209 Blvd. of the Allies, Pittsburgh 22, Pa.

PUMPS (Boiler Feed)

Aldrich Pump Co., The, 8 Pine St., Allentown, Pa.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
DeLaval Steam Turbine Co., Trenton, N. J.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

PUMPS (Centrifugal)

Aldrich Pump Co., The, 8 Pine St., Allentown, Pa.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
DeLaval Steam Turbine Co., Trenton, N. J.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Gray-Mills Co., 1948-52 Ridge Ave., Evanston, Ill.
Ingersoll-Rand Co., Phillipsburg, N. J.
Jaeger Machine Co., The, 550 W. Spring St., Columbus 15, O.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Schneible, Claude B., Co., 2827 25th St., Detroit 16, Mich.

PUMPS (Fuel Injection)

Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.

PUMPS (High Pressure)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
DeLaval Steam Turbine Co., Trenton, N. J.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Roper, Geo. D., Co., The, Rockford, Ill.

PUMPS (Hydraulic)

Aldrich Pump Co., The, 8 Pine St., Allentown, Pa.
Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
DeLaval Steam Turbine Co., Trenton, N. J.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Galland-Henning Manufacturing Co., 2747 S. 31st St., Milwaukee 7, Wis.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Roper, Geo. D., Co., The, Rockford, Ill.
Schloemann Engineering Corp., 1105 Empire Bldg., Pittsburgh 22, Pa.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.
Vickers Inc., 1480 Oakman Blvd., Detroit 32, Mich.
Watson-Stillman Co., Roselle, N. J.
Wood, R. D., Co., 400 Chestnut St., Philadelphia 5, Pa.

PUMPS (Lubricating)

Nichols, W. H., and Sons, 48 Woerd Ave., Waltham 54, Mass.
Stewart-Warner Corp., Alemite Div., 1879 W. Diversey Blvd., Chicago 14, Ill.

PUMPS (Metering)

Adel Precision Products Corp., 10345 Van Owen St., Burbank, Cal.
Nichols, W. H., and Sons, 48 Woerd Ave., Waltham 54, Mass.

PUMPS (Pressure)

Nichols, W. H., and Sons, 48 Woerd Ave., Waltham 54, Mass.

PUMPS (Reciprocating)

Aldrich Pump Co., The, 8 Pine St., Allentown, Pa.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.

PUMPS (Rotary)

Adel Precision Products Corp., 10345 Van Owen St., Burbank, Cal.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
DeLaval Steam Turbine Co., Trenton, N. J.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Nichols, W. H., and Sons, 48 Woerd Ave., Waltham 54, Mass.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Roper, Geo. D., Co., The, Rockford, Ill.
Vickers, Inc., 1480 Oakman Blvd., Detroit 32, Mich.

PUMPS (Vacuum)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.

PUMPS (Vertical Turbine)

DeLaval Steam Turbine Co., Trenton, N. J.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Layne & Bowler, Inc., Memphis 8, Tenn.
Watson-Stillman Co., Roselle, N. J.

PUNCHES (Multiple)

Beatty Machine & Mfg. Co., Hammond, Ind.
Cincinnati Shaper Co., The, Garrand and Elam Sts., Cincinnati 25, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Ferracute Machine Co., Bridgeton, N. J.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
Wales Strippit Corp., 385 Payne Ave., N. Tonawanda, N. Y.

PUNCHING AND SHEARING MACHINERY

Beatty Machine & Mfg. Co., Hammond, Ind.
Bliss, E. W., Co., 53rd St. & Second Ave., Brooklyn 32, N. Y.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Chambersburg Engineering Co., Chambersburg, Pa.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Continental Foundry & Machine Co., E. Chicago, Ind.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Wean Engineering Co., Inc., The.
Watson-Stillman Co., Roselle, N. J.
Warren, O.

PYROMETER TUBES

Carborundum Co., The, Niagara Falls, N. Y.
Norton Company, Worcester 6, Mass

PYROMETERS

Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.

RACKS & PINIONS

Industrial Gear Mfg. Co., 4545 W. Van Buren St., Chicago 24, Ill.

RAIL BREAKERS

United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.

RAILS (New and Relaying)

Drake Steel Supply Co., 10660 S. Alameda St., Los Angeles 2, Cal.
Dulien Steel Products, Inc., 414 First Ave. S., Seattle, Wash.
Foster, L. B., Co., Inc., P. O. Box 1647, Pittsburgh, Pa.
Sonken-Galamba Corp., 108 N. 2nd St., Kansas City, Kans.

RAILS (Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.

REAMERS

Black Drill Co., 1400 E. 222nd St., Cleveland 17, O.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O.
Genesee Tool Co., Fenton, Mich.
Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Haynes Stellite Co., 30 E. 42nd St., New York 17, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

REAMERS (Carbide Tipped)

Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O.
Gisholt Machine Co., 1245 E. Washington St., Madison 3, Wis.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Spe-D-Cut Tool Co., 9th & Lyons Sts., Hannibal, Mo.

REBUILT EQUIPMENT

Albert, L., & Son, Whitehead Rd., Trenton, N. J.
General Blower Co., 404 N. Peoria St., Chicago 22, Ill.
Iron & Steel Products, Inc., Hegewisch Sta., Chicago 33, Ill.
Simmons Machine Tool Corp., 1755 N. Broadway, Albany 1, N. Y.
West Penn Machinery Co., 1208 House Bldg., Pittsburgh, Pa.

RECEIVERS

Scaife Co., Ann St., Oakmont, Pa.

RECORD FORMS

Remington-Rand Inc., Systems Div., 415 Fourth Ave., New York 10, N. Y.
United Autographic Register Co., 5000 S. California Ave., Chicago 32, Ill.

RECORD KEEPING SYSTEMS

Remington-Rand Inc., Systems Div., 415 Fourth Ave., New York 10, N. Y.
United Autographic Register Co., 5000 S. California Ave., Chicago 32, Ill.

RECORDERS (Combustion)

Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.

RECORDERS (Pressure, Speed, Temperature, Time)

Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.

RECTIFIERS (Dry Disc)

Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
General Electric Co., Sec. A 443-90, Tungar & Metallic Rectifier Div., Bridgeport 2, Conn.
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.
Meaker Co., The, 1635 S. 55th Ave., Chicago 50, Ill.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

RECTIFIERS (Mercury Arc)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
General Electric Co., Schenectady 5, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

REDUCTION GEARS

DeLaval Steam Turbine Co., Trenton, N. J.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Foote Bros. Gear & Machine Co., 5225 S. Western Blvd., Chicago 9, Ill.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
James, D. O., Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Link-Belt Co., 2045 W. Hunting Park Ave., Philadelphia 40, Pa.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Philadelphia Gear Works, Erie Ave., & G St., Philadelphia 34, Pa.
Stokerunit Corp., 4548 W. Mitchell St., Milwaukee 14, Wis.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Twin Disc Clutch Co., 1379 Racine Ave., Racine, Wis.
Westinghouse Electric Corp., 200 McCandless Ave., Pittsburgh 1, Pa.

REELS (Automatic Centering)

Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13, Ill.

REELS (Coiling & Pay-Off)

Parish Pressed Steel Co., Reading, Pa.
Paxson Machine Co., Salem, O.

REFRACTORIES (Chrome)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

REFRACTORIES (Dolomite)

Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

REFRACTORIES (Fire Clay)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Electro Refractories & Alloys Corp. Vars Bldg., Buffalo 2, N. Y.
Eureka Fire Brick Works, 1100 B. F. Jones Law Bldg., Pittsburgh 19, Pa.
Globe Brick Co., The, East Liverpool, O.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
National Fireproofing Corp., 202 E. Ohio St., Pittsburgh 12, Pa.
Remmey, Richard C., Son Co., Hedley St. & Delaware River, Philadelphia 37, Pa.

REFRACTORIES (For High Frequency Furnaces)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Carborundum Co., The, Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Norton Co., Worcester 6, Mass.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.

REFRACTORIES (Forsterite)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

REFRACTORIES (High Alumina)

Carborundum Co., The, Niagara Falls, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

REFRACTORIES (Insulating)

Carborundum Co., The, Niagara Falls, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

REFRACTORIES (Magnesia)

Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Norton Co., Worcester 6, Mass.

REFRACTORIES (Magnesite)

Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

REFRACTORIES (Plastic)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Remmey, Richard C., Son Co., Hedley St. & Delaware River, Philadelphia 37, Pa.

REFRACTORIES (Silica)

Carborundum Co., The, Niagara Falls, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

REFRACTORIES (Silicon Carbide)

Carborundum Co., The, Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Norton Co., Worcester 6, Mass.
Remmey, Richard C., Son Co., Hedley St. & Delaware River, Philadelphia 37, Pa.

REFRACTORY CEMENT AND CONCRETE

Atlas Lumnite Cement Co., Dept. S., Chrysler Bldg., New York 17, N. Y.
Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Carborundum Co., The, Niagara Falls, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Norton Co., Worcester 6, Mass.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
National Fireproofing Corp., 202 E. Ohio St., Pittsburgh 12, Pa.
Remmey, Richard C., Son Co., Hedley St. & Delaware River, Philadelphia 37, Pa.

REFRIGERATION EQUIPMENT (Industrial)

General Electric Co., (Air Conditioning & Commercial Refrigeration Div., Sec. 4412), Bloomfield, N. J.
Gray-Mills Co., 1948-52 Ridge Ave., Evanston, Ill.
Kold-Hold Mfg. Co., 444 N. Grand Ave., Lansing 4, Mich.
Motor Products Corp., Deep Freeze Div., 2309-7 Davis St., N. Chicago, Ill.

REGULATORS (Pressure)

Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Metallizing Co. of America, 1330 W. Congress St., Chicago 7, Ill.
Square D Co., 6060 Rivard St., Detroit 11, Mich.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

REGULATORS (Temperature)

Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.

REGULATORS (Voltage)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
General Electric Co., Schenectady 5, N. Y.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

REGULATORS (Welding & Cutting)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

REINFORCEMENT FABRIC (Electric Welded)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.

RELAYS (Magnetic)

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.

RESISTORS (Alloy Grid or Wire Wound—Electric)

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.
Guyan Machinery Co., Logan, W. Va.
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

RESISTORS (Graphite Disc)

Allen-Bradley Co., 1316 S. 2nd St., Milwaukee 4, Wis.

RESPIRATORS

Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

RHEOSTATS

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.

RINGS (Aluminum, Brass, Bronze)

Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.

RINGS (Steel)

American Welding & Mfg. Co., The Warren, O.
Cleveland Welding Co., The, W. 117th St. & Berea Rd., Cleveland 7, O.
Commercial Forgings Co., The, 3700 E. 91st St., Cleveland 5, O.
Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Standard Products Co., The, 505 Boulevard Bldg., Detroit 2, Mich.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.

RINGS (Weldless) (*Also Stainless)

Commercial Forgings Co., The, 3700 E. 91st St., Cleveland 5, O.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
McQuay-Norris Mfg. Co., 2320 Marconi St., St. Louis 10, Mo.
*Midvale Co., The, Nicetown, Philadelphia 40, Pa.

RIVETERS (Hydraulic—Portable and Stationary)

Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.

RIVETERS (Pneumatic)

Cleveland Pneumatic Tool Co., The, 3781 E. 77th St., Cleveland 5, O.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

RIVETING MACHINERY

Chambersburg Engineering Co., Chambersburg, Pa.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Tomkins-Johnson Co., The, Dept. S, 611 N. Mechanic St., Jackson, Mich.
Wood, R. D., Co., 400 Chestnut St., Philadelphia 5, Pa.

RIVETS (*Also Stainless)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh - Chicago
Champion Rivet Co., The, 11200 Harvard Ave., Cleveland 5, O.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
*Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
Hassall, John, Inc., 402 Oakland St., Brooklyn 22, N. Y.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
*National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
*Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
*Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.
*Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Triplex Screw Co., The, 5341 Grant Ave., Cleveland 5, O.

RIVETS (Blind)

Clark Equipment Co., Buchanan, Mich.

RIVETS (Nonferrous)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
*Hassall, John, Inc., 402 Oakland St., Brooklyn 22, N. Y.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

RODS (Alloy)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Ampco Metal Inc., Dept. S6, Milwaukee 4, Wis.
Bethlehem Steel Co., Bethlehem, Pa.

RODS (Alloy) (Con.)

Bliss & Laughlin, Inc., Harvey, Ill.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Copperweld Steel Co., Warren, O.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.

RODS (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Dow Chemical Co., The, Midland, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Titan Metal Mfg. Co., Bellefonte, Pa.

RODS (Brass, Bronze, Phosphor Bronze, Silicon Bronze, Copper, Nickel Silver)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
Revere Copper & Brass Co., Inc., 230 Park Ave., New York 17, N. Y.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Seymour Manufacturing Co., The, 51 Franklin St., Seymour, Conn.
Titan Metal Mfg. Co., Bellefonte, Pa.

RODS (Drill)

Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
Anchor Drawn Steel Co., Latrobe, Pa.
Benedict-Miller Inc., 216 Clifford St., Newark 5, N. J.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Purdy, A. R., Co., 790 Greenwich St., New York 14, N. Y.
Sandvik Steel, Inc., 111 Eighth Ave., New York 11, N. Y.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

RODS (Iron and Steel)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Roebling's, John A., Sons Co., Trenton 2, N. J.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

RODS (Rounds, Flats and Shapes) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
*American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Copperweld Steel Co., Warren, O.
*Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
*Firth-Sterling Steel Co., McKeesport, Pa.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
*Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
*Republic Steel Corp., Dept. ST, Cleveland 4, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Washburn Wire Co., Phillipsdale, R. I.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

RODS (Wire)—See WIRE PRODUCTS

ROLL FORMING MACHINES

Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Wean Engineering Co., Inc., The, Warren, O.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

ROLL HEATERS—See HEATERS (Electric Roll)

ROLLING DOORS & SHUTTERS—See DOORS AND SHUTTERS

ROLLING MILL BEARINGS—See BEARINGS (Rolling Mill)

ROLLING MILL ENGINEERS (Consulting and Contracting)

Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Schloemann Engineering Corp., 1105 Empire Bldg., Pittsburgh 22, Pa.

ROLLING MILL EQUIPMENT

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Alliance Machine Co., The, Alliance, O.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Bliss, E. W., Co., 53rd St. & Second Ave., Brooklyn 32, N. Y.
Cold Metal Products Co., The, 2131 Wilson Ave., Youngstown 1, O.
Continental Foundry & Machine Co., E. Chicago, Ind.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morgan Construction Co., Worcester 5, Mass.
Morgan Engineering Co., The, Alliance, O.
Paxson Machine Co., Salem, O.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Streine Tool & Mfg. Co., The, New Bremen, O.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Wean Engineering Co., Inc., The, Warren, O.

ROLLING MILL MACHINERY (Used)

Foster, Frank B., Oliver Bldg., Pittsburgh, Pa.

ROLLING MILL TABLES AND ROLLERS

Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Schloemann Engineering Corp., 1105 Empire Bldg., Pittsburgh 22, Pa.

ROLLS (Bending and Straightening)

Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Cleveland Punch & Shear Works Co., The, 8917 St. Clair Ave., Cleveland 14, O.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Medart Co., The 3500 DeKalb St., St. Louis 18, Mo.
Wean Engineering Co., Inc., The, Warren, O.
Webb Corp., The, Webb City, Mo.

ROLLS (Crushing)

Vulcan Iron Works, Wilkes-Barre, Pa.

ROLLS (Iron and Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Commercial Forgings Co., The, 3700 E. 91st St., Cleveland 5, O.
Continental Foundry & Machine Co., E. Chicago, Ind.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hyde Park Fdry. and Machine Co., Hyde Park, Pa.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Ohio Steel Foundry Co., Lima, O., Springfield, O.
Pittsburgh Rolls Div., Blaw-Knox Co., Pittsburgh 1, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.

ROLLS (Nonferrous)

National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.

ROLLS (Sand and Chilled)

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Continental Foundry & Machine Co., E. Chicago, Ind.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Ohio Steel Foundry Co., Lima, O.-Springfield, O.
Pittsburgh Rolls Div. of Blaw-Knox Co., Pittsburgh 1, Pa.
United Engineering & Fdry Co., First National Bank Bldg., Pittsburgh 22, Pa.

ROLLS (Tinning Machine)

American Shear Knife Co., P. O. Box 355, Homestead, Pa.
Wean Engineering Co., Inc., The, Warren, O.

ROOFING, SIDING & FLASHING

Bethlehem Steel Co., Bethlehem, Pa.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Protected Steel Products Co., 33 Pride St., Pittsburgh 19, Pa.
Reeves Steel & Mfg. Co., Dover, O.

ROOFING AND SIDING (Corrugated and Plain)

American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Continental Steel Corp., Kokomo, Ind.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
New Jersey Zinc Co., 160 Front St., New York 7, N. Y.
Reeves Steel & Mfg. Co., Dover, O.
Reliance Steel Corp. Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Sons, Inc., 16th and Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Weirton Steel Co., Weirton, W. Va.

ROOFING (Plastic and Liquid)

Koppers Co., Tar & Chemical Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

ROTARY CONVERTERS

Kato Engineering Co., Mankato, Minn.

RUBBER GOODS (Industrial)

Boston Woven Hose & Rubber Co., P.O. Box 1071, Boston 3, Mass.
Gates Rubber Co., The, 999 S. Broadway, Denver 17, Colo.
Goodrich, B. F., Co., The, Akron 19, O.
Standard Products Co., The, 505 Boulevard Bldg., Detroit 2, Mich.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

RUBBER LINING (Hard and Soft)

United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

RUST PREVENTIVES

American Chemical Paint Co., Ambler, Pa.
Hood Refining Co., N. Hamilton Ave., Greensburg, Pa.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
International Rustproof Corp., 12507-15 Plover Ave., Cleveland 7, O.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Kondor Products Corp., West Clifton Blvd. at Sloane, Cleveland 7, O.
Koppers Co., Tar & Chemical Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Nox-Rust Corporation, 2461 S. Halsted St., Chicago 8, Ill.
Rheem Research Products Inc., 206 Standard Oil Bldg., Baltimore 2, Md.
Stewart-Warner Corp., Alemite Div., 1879 W. Diversey Blvd., Chicago 14, Ill.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.

RUST PROOFING PROCESSES AND EQUIPMENT

American Chemical Paint Co., Ambler, Pa.
Detrex Corporation, 13029 Hillview Ave., Detroit 4, Mich.
Enterprise Galvanizing Co., 3525 E. Cumberland St., Philadelphia 25, Pa.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
International Rustproof Corp., 12507-15 Plover Ave., Cleveland 7, O.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Nox-Rust Corporation, 2461 S. Halsted St., Chicago 8, Ill.
Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Parker Rust Proof Co., 2158 E. Milwaukee Ave., Detroit 11, Mich.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

SAFE ENDS (Boiler Tube)

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.

SAFETY DEVICES (Electric)

Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

SAFETY EQUIPMENT

Hy-Test Div. International Shoe Co., 1509 Washington Ave., St. Louis 3, Mo.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Protectoseal Co., 1920 S. Western Ave., Chicago 8, Ill.
Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

SALT TABLETS

Morton Salt Co., 310 S. Michigan Ave., Chicago 4, Ill.

SAND BLAST EQUIPMENT

American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Metallizing Co. of America, 1330 W. Congress St., Chicago 7, Ill.
Pangborn Corporation, Hagerstown, Md.
Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

SAND CONDITIONING AND PREPARING MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

SAW GUNS (Electric)

Mid-States Equipment Co., Saw-Gun Div., 2425 S. Michigan Ave., Chicago 16, Ill.
Wyzenbeek & Staff Inc., 838 W. Hubbard St., Chicago 22, Ill.

SAWING MACHINES (Contour)

Continental Machines, Inc., 1324 Washington Ave., Minneapolis 4, Minn.

SAWING MACHINES (Hack)

Armstrong-Blum Mfg. Co., 5700 Bloomingdale Ave., Chicago 39, Ill.

SAWING MACHINES (Hot and Cold)

Armstrong-Blum Mfg. Co., 5700 Bloomingdale Ave., Chicago 39, Ill.
Consolidated Machine Tool Corp., 585 Blossom Rd., Rochester 10, N. Y.
Morgan Engineering Co., The, Alliance, O.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Wells Mfg. Co., 1515 Fillmore St., Three Rivers, Mich.

SAWS (Band—Metal Cutting)

Armstrong-Blum Mfg. Co., 5700 Bloomingdale Ave., Chicago 39, Ill.
Delta Mfg. Co., The, 703N E. Vienna Ave., Milwaukee 1, Wis.
Disston, Henry, & Sons, Inc., 626 Tacony, Philadelphia 35, Pa.
DoAll Co., The, 231 N. Laurel Ave., Des Plaines, Ill.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Wells Mfg. Co., 1515 Fillmore St., Three Rivers, Mich.

SAWS (Hack)

Armstrong-Blum Mfg. Co., 5700 Bloomingdale Ave., Chicago 39, Ill.
Disston, Henry, & Sons, Inc., 626 Tacony, Philadelphia 35, Pa.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.

SAWS (Inserted Tooth, Cold)

Disston, Henry, & Sons, Inc., 626 Tacony, Philadelphia 35, Pa.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.

SAWS (Metal Cutting)

Armstrong-Blum Mfg. Co., 5700 Bloomingdale Ave., Chicago 39, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Delta Mfg. Co., The, 703N E. Vienna Ave., Milwaukee 1, Wis.
Disston, Henry, & Sons, Inc., 626 Tacony, Philadelphia 35, Pa.
DoAll Co., The, 231 N. Laurel Ave., Des Plaines, Ill.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.
Wells Mfg. Co., 1515 Fillmore St., Three Rivers, Mich.

SAWS (Segmental)

Disston, Henry, & Sons, Inc., 626 Tacony, Philadelphia 35, Pa.
Simonds Saw & Steel Co., 1350 Columbia Rd. Boston 27, Mass.

SCALES

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Streeter-Amet Co., 4103 Ravenswood Ave., Chicago 13, Ill.
Toledo Scale Co., P. O. Box 97, W. Toledo Sta., Toledo 12, O.

SCALES (Dial & Recording)

Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Streeter-Amet Co., 4103 Ravenswood Ave., Chicago 13, Ill.
Toledo Scale Co., P. O. Box 97, W. Toledo Sta., Toledo 12, O.

SCALES (Laboratory)

Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Toledo Scale Co., P. O. Box 97, W. Toledo Sta., Toledo 12, O.

SCALES (Monorail)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.
Toledo Scale Co., P. O. Box 97, W. Toledo Sta., Toledo 12, O.

SCALES (Steel Mill)

Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Toledo Scale Co., P. O. Box 97, W. Toledo Sta., Toledo 12, O.

SCREENS (Vibrating)

Ajax Flexible Coupling Co., 4 English St., Westfield, N. Y.
Link-Belt Co., 2045 W. Hunting Park Ave., Philadelphia 40, Pa.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.

SCREENS AND SIEVES

Ajax Flexible Coupling Co., 4 English St., Westfield, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Chicago Perforating Co., 2443 W. 24th Pl., Chicago 8, Ill.
Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., 171 York St., Rochester 11, N. Y.
Harrington & King Perforating Co., 5634 Fillmore St., Chicago 44, Ill.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Koppers Co., Engineering & Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.

SCREWDRIVERS (Power)

Detroit Power Screwdriver Co., 2813 W. Fort St., Detroit 16, Mich.

SCREW MACHINE PRODUCTS

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Burgess-Norton Mfg. Co., 778 Peyton St., Geneva, Ill.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Grammes, L. F., & Sons, Inc., Allentown, Pa.
Hindley Mfg. Co., Valley Falls, R. I.
Joyce Machine Co., 2080 Wheatsheaf Lane, Philadelphia 24, Pa.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
New Britain Machine Co., New Britain, Conn.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Titan Metal Mfg. Co., Bellefonte, Pa.
Tourek, J. J., Mfg. Co., 4701-11 W. 16th St., Chicago 50, Ill.
U. S. Automatic Corp., Amherst, O.

SCREW MACHINES (Automatic, Single and Multiple Spindle)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cleveland 3, O.
Cone Automatic Machine Co., Inc., Windsor, Vt.
Greenlee Bros. & Co., 1927 Mason Ave., Rockford, Ill.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
New Britain Machine Co., New Britain, Conn.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.
Sheffield Corp., The, 721 Springfield St., Dayton 1, O.

SCREW STOCK—See STEEL (Screw Stock)

SCREWS (Cap, Set, Safety-Set)

Boss Bolt & Nut Co., Div. of The Lock Nut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
Chicago Screw Company, The, 1026 S. Homan Ave., Chicago 24, Ill.
Cleveland Cap Screw Co., The, 2935 E. 79th St., Cleveland 4, O.
Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Parker-Kalon Corp., 194-200 Varick St., New York 14, N. Y.
Triplex Screw Co., 5341 Grant Ave., Cleveland 5, O.
U. S. Automatic Corp., Amherst, O.

SCREWS (Cold Headed)

American Screw Co., Providence 1, R. I.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Cleveland Cap Screw Co., The, 2935 E. 79th St., Cleveland 4, O.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Hassall, John, Inc., 402 Oakland St., Brooklyn 22, N. Y.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.

SCREWS (Conveyor)

Link-Belt Co., 2410 W. 18th St., Chicago 8, Ill.

SCREWS (Hardened Metallic Drive)

American Screw Co., Providence 1, R. I.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
Parker-Kalon Corp., 194-200 Varick St., New York 14, N. Y.
U. S. Automatic Corp., Amherst, O.

SCREWS (Hardened Self-Tapping)

American Screw Co., Providence 1, R. I.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Parker-Kalon Corp. 194-200 Varick St., New York 14, N. Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.

SCREWS (Machine)

American Screw Co., Providence 1, R. I.
Boss Bolt & Nut Co., Div. of The Lock Nut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Triplex Screw Co., 5341 Grant Ave., Cleveland 5, O.
U. S. Automatic Corp., Amherst, O.

SCREWS (Machine, Recessed Head)

American Screw Co., Providence 1, R. I.
Bristol Co., Waterbury 91, Conn.
Central Screw Co., Chicago 9, Ill.
Chandler Products Co., Euclid 17, O.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
International Screw Co., Detroit 4, Mich.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., 2440 E. 75th St., Cleveland 4, O.
New England Screw Co., Keene, N. H.
Parker-Kalon Corp., 194-200 Varick St., New York 14, N. Y.
Pawtucket Screw Co., Pawtucket, R. I.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Mfg. Co., Waterbury 91, Conn.
U. S. Automatic Corp., Amherst, O.

SCREWS (Nonferrous and Stainless)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Screw Co., Providence 1, R. I.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Federal Screw Works, 3401 Martin Ave., Detroit 10, Mich.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Harper, H. M. Co., The, 2646 Fletcher St., Chicago 18, Ill.
Hassall, John, Inc., 402 Oakland St., Brooklyn 22, N. Y.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Tourek, J. J., Mfg. Co., 4701-11 W. 16th St., Chicago 50, Ill.

SCREWS (Sheet Metal, Recessed Head)

American Screw Co., Providence 1, R. I.
Bristol Co., Waterbury 91, Conn.
Central Screw Co., Chicago 9, Ill.
Chandler Products Co., Euclid 17, O.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., 2440 E. 75th St., Cleveland 4, O.
Parker-Kalon Corp., 194-200 Varick St., New York 14, N. Y.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Shakeproof Lock Washer Co., Chicago, Ill.

SCREWS (Socket, Cold Forged)

Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Parker-Kalon Corp., 194-200 Varick St., New York 14, N. Y.

SCREWS (Thread Cutting)

American Screw Co., Providence 1, R. I.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Parker-Kalon Corp., 194-200 Varick St., New York 14, N. Y.

SCREWS (Thumb)

National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Parker-Kalon Corp., 194-200 Varick St., New York 14, N. Y.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

SCREWS (Valve Tappet)

Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
U. S. Automatic Corp., Amherst, O.

SCREWS (Wood, Recessed Head)

American Screw Co., Providence 1, R. I.
Boss Bolt & Nut Co., Div. of The Lock Nut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.

SCREWS (Wood, Recessed Head) (Con.)

Bristol Co., Waterbury 91, Conn.
Chandler Products Co., Euclid 17, O
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., 2440 E. 75th St., Cleveland 4, O
Parker, Charles, Co., The, Meriden, Conn.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Co., Nashua, N. H

SCRUBBERS (Gas or Air)—See GAS SCRUBBERS

SEALS (Oil and Grease)

Chicago Rawhide Mfg. Co., 1308 Elston Ave., Chicago 22, Ill
Goodrich, B. F., Co., The, Akron 19, O.
Syntron Co., 370 Lexington Ave., Homer City, Pa.

SEAMLESS STEEL TUBING—See TUBING (Seamless Steel)

SEPARATORS (Magnetic)

Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Ohio Electric Mfg. Co., The, 5906 Maurice Ave., Cleveland 4, O.

SHACKLES

Bethlehem Steel Co., Bethlehem, Pa.

SHAFT HANGERS—See HANGERS

SHAFTING

American Brass Co., The, Waterbury 88, Conn.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Commercial Forgings Co., The 3700 E. 91st St., Cleveland 5, O.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg. Pittsburgh 30, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Union Drawn Steel Div., Republic Steel Corp., Massillon, O.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wyckoff Steel Co., P. O. Box 1256, Pittsburgh 30, Pa.

SHAFTING (Flexible)

Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

SHAPERS

Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Cincinnati Shaper Co., The, Garrard and Elam Sts., Cincinnati 25, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Rockford Machine Tool Co., 2400 Kishwaukee St., Rockford, Ill.

SHAPERS (Spindle)

Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

SHAPES (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville, Ky.
Dow Chemical Co., The, Midland, Mich.

SHAPES (Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Brandt, Charles T., Inc., 1702 Ridgley St., Baltimore 30, Md
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Union Drawn Steel Div., Republic Steel Corp., Massillon, O.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wyckoff Steel Co., P. O. Box 1256 Pittsburgh 22, Pa.

SHEAR BLADES

American Shear Knife Co., P. O. Box 355, Homestead, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Disston, Henry, & Sons, Inc., 626 Tacony, Philadelphia 35, Pa.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Lewthwaite, T. H., Machine Co., Inc., 311 E. 47th St., New York 17, N. Y.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Simonds Worden White Co., 714 Negeley Place, Dayton 7, O.

SHEARS

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Beatty Machine & Mfg. Co., Hammond, Ind.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Cincinnati Shaper Co., The, Garrard and Elam Sts., Cincinnati 25, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Continental Foundry & Machine Co., E. Chicago, Ind.
Hyde Park Fdy. & Mach. Co., Hyde Park, Pa.
Lewis Fdry. & Mach. Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Lewthwaite, T. H., Machine Co., Inc., 311 E. 47th St., New York 17, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
O'Neil-Irwin Mfg. Co., 304 8th Ave. S., Minneapolis 15, Minn.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Streine Tool & Mfg. Co., The New Bremen, O.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
United Engineering & Fdry Co., First National Bank Bldg., Pittsburgh 22, Pa.
Watson-Stillman Co., Roselle, N. J.

SHEARS, ROTARY (Slitting, Beveling, Circling, Flanging)

Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Paxson Machine Co., Salem, O.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Wean Engineering Co., Inc., The Warren, O.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

SHEET BARS

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept ST. Cleveland 4, O.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.

SHEET LIFTERS AND CARRIERS

American MonoRail Co., The, 18102 Athens Ave., Cleveland 7, O.
Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.
Hyde Park Fdy. & Mach. Co., Hyde Park, Pa.
Merrill Brothers, 56-04 Arnold Ave. Maspeth, N. Y.
J-B Engineering Sales Co., 3101 East St., New Haven 3, Conn.
Palmer-Shile Co., 7100 W. Jefferson Ave., Detroit 17, Mich.

SHEET METAL PRODUCTS—See STAMPINGS

SHEET METAL WORKERS MACHINES

Cincinnati Shaper Co., The, Garrard and Elam Sts., Cincinnati 25, O.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Lewthwaite, T. H., Machine Co., Inc., 311 E. 47th St., New York 17, N. Y.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Streine Tool & Mfg. Co., The New Bremen, O.

SHEET WRAPPING (Paper)

Sisalkraft Co., The, 205 W. Wacker Drive, Chicago 6, Ill.

SHEET STEEL PILING (New and Used)

American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Foster, L. B., Co., Inc., P. O. Box 1647, Pittsburgh, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.

SHEETS (Acid Resisting)

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Haynes Stellite Co., 30 E. 42nd St., New York 17, N. Y.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill

SHEETS (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Dow Chemical Co., The, Midland, Mich.
Reliance Steel Corp. Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

SHEETS (Black)

Alan Wood Steel Co., Conshohocken, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh - Chicago
Columbia Steel Co., San Francisco 6, Calif.
Continental Steel Corp., Kokomo, Ind.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Reeves Steel & Mfg. Co., Dover, O.
Reliance Steel Corp. Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Superior Sheet Steel Div., Continental Steel Corp., Canton, O.
Todd Steel Corp., 370 Midland Ave., Detroit 3, Mich.
Youngstown Sheet & Tube Co., The Youngstown 1, O.
Wolff, Benjamin, & Co., 58th St. & Seeley Ave., Chicago 36, Ill.

SHEETS (Brass, Bronze, Phosphor Bronze, Silicon Bronze, Copper, Nickel, Nickel Silver)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
International Nickel Co., Inc., The 67 Wall St., New York 5, N. Y.
Revere Copper & Brass Co., Inc., 230 Park Ave., New York 17, N.Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Seymour Manufacturing Co., The, 51 Franklin St., Seymour, Conn.
Western Brass Mills, Div. of Olin Industries, East Alton, Ill.

SHEETS (Corrugated)

American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
Apollo Steel Co., 2243-2244 Oliver Bldg., Pittsburgh 22, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Continental Steel Corp., Kokomo, Ind.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg. Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Reeves Steel & Mfg. Co., Dover, O.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill
Weirton Steel Co., Weirton, W. Va.
Wolff, Benjamin, & Co., 58th St. & Seeley Ave., Chicago 36, Ill.

SHEETS (Deep Drawing and Stamping)

Alan Wood Steel Co., Conshohocken, Pa.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Petrometal Corp., Broadway at 11th St., Long Island City 2, N. Y.
American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
Apollo Steel Co., 2243-2244 Oliver Bldg., Pittsburgh 22, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
General Steel Warehouse Co., Inc. 1830 N. Kostner Ave., Chicago 39, Ill.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Reliance Steel Corp. Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Todd Steel Corp., 370 Midland Ave., Detroit 3, Mich.
United States Steel Supply Co., P. O Box M M, Chicago 90, Ill.

SHEETS (Deep Drawing and Stamping) (Con.)
Weirton Steel Co., Weirton, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

SHEETS (Electrical)
Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa
Granite City Steel Co., Granite City, Ill.
Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

SHEETS (Electrolytic Zinc Coated)
American Nickeloid Co., 1310 Second St., Peru, Ill.
Weirton Steel Co., Weirton, W. Va.

SHEETS (Enameling)
Follansbee Steel Corp. Third & Liberty Sts., Pittsburgh 30, Pa.
Great Lakes Steel Corp., Ecorse Tecumseh Rd., Detroit 18, Mich.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.

SHEETS (Galvanized)
American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
Apollo Steel Co., 2243-2244 Oliver Bldg., Pittsburgh 22, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Continental Steel Corp., Kokomo, Ind.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Reeves Steel & Mfg. Co., Dover, O.
Reliance Steel Corp. Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Superior Sheet Steel Div., Continental Steel Corp., Canton, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.

SHEETS (High Finished)
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
Apollo Steel Co., 2243-2244 Oliver Bldg., Pittsburgh 22 Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg. Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

SHEETS (Hot Rolled and Hot Rolled Annealed)
Alan Wood Steel Co., Conshohocken, Pa.
American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
Apollo Steel Co., 2243-2244 Oliver Bldg., Pittsburgh 22, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Continental Steel Corp., Kokomo, Ind.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Disston, Henry, & Sons, Inc. 626 Tacony, Philadelphia 35, Pa.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg. Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Reeves Steel & Mfg. Co., Dover, O.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Todd Steel Corp., 370 Midland Ave., Detroit 3, Mich.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Worth Steel Co., Claymont, Del.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

SHEETS (Hot rolled, Pickled & Annealed)
Jessop Steel Co., 584 Green St., Washington, Pa.
Reliance Steel Corp. Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Todd Steel Corp., 370 Midland Ave., Detroit 3, Mich.

SHEETS (Lead or Lead Alloy Coated)
Continental Steel Corp., Kokomo, Ind.
National Lead Co., 111 Broadway, New York 6, N. Y.
Superior Sheet Steel Div., Continental Steel Corp., Canton O.
Weirton Steel Co., Weirton, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.

SHEETS (Long Terne)
American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Steel Corp., Kokomo, Ind.
Reliance Steel Corp. Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Superior Sheet Steel Div., Continental Steel Corp., Canton, O.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

SHEETS (Perforated)
Diamond Mfg. Co., Wyoming, Pa.
Harrington & King Perforating Co., 5634 Fillmore St., Chicago 44, Ill.

SHEETS (Porous)
Moraine Products Div., General Motors Corp., Dayton 1, O.

SHEETS (Roofing)—See ROOFING AND SIDING (Corrugated and Plain)

SHEETS (Stainless)
Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Eastern Stainless Steel Co., 122 Rolling Mill Ave., Baltimore 3, Md.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Republic Steel Corp., Massillon, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.

SHEETS (Stainless Clad)
Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
Granite City Steel Co., Granite City, Ill.
Ave., Chicago 4, Ill.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Jessop Steel Co., 584 Green St., Washington, Pa.

SHEETS (Tin)—See TIN or TERNE PLATE

SHEETS (Tin Mill Black)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Reeves Steel & Mfg. Co., Dover, O.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Weirton Steel Co., Weirton, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

SHELLS (Seamless Drawn)
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.

SHIMS (Laminated
Laminated Shim Co., Inc., 87 Union St., Glenbrook, Conn.

SHOES
Hy-Test Div. International Shoe Co., 1509 Washington Ave., St. Louis 3, Mo.

SHOES (Safety)
Hy-Test Div. International Shoe Co., 1509 Washington Ave., St. Louis 3, Mo.

SHOOK (Crate & Box)
Morgan Lumber Sales Co., 8 East Long St., Columbus, O.
Rathborne, Hair & Ridgway Co., 1440 W. 21st Place, Chicago 8, Ill.

SHOT PEENING
American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.

SHOVELS (Power)
Northwest Engineering Co., 28 E. Jackson Blvd., Chicago 4, Ill.
Thew Shovel Co., The, Lorain, O.

SHOVELS, SPADES, SCOOPS (Hand)
Wood Shovel & Tool Co., Piqua, O.

SHRINKING EQUIPMENT (Metal)
Motor Products Corp., Deep Freeze Div., 2309-7 Davis St., N. Chicago, Ill.

SIEVES—See SCREENS AND SIEVES

SIGNS (Metal)
Grammes, L. F., & Sons, Inc., Allentown, Pa.
Webb Corp., The, Webb City, Mo.

SILICO-MANGANESE
Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Samuel, Frank & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

SILICON BRONZE
Ajax Metal Co., Philadelphia 43, Pa.
American Brass Co., The, Waterbury 88, Conn.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Bridgeport Brass Co., Bridgeport 2, Conn.

SILICON METAL AND ALLOYS
Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N.Y.

SILICONES (Compounds, Fluids, Greases, Insulating Varnishes, Resins, Rubber)
Dow Corning Corp., P. O. Box 592, Midland, Mich.

SKELP (Steel)
Alan Wood Steel Co., Conshohocken, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.

SKIPS (Materials Handling)
Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.

SLAG GRANULATING MACHINES (Blast Furnace & Open Hearth)
Brosius, Edgar E., Co., Sharpsburg P. O., Pittsburgh 15, Pa.

SLEEVES (Cylinder)
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.

SLEEVES (Pipe, Pipe Repair)
Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.

SLEEVES (Piston, Pump & Shaft)
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.

SLEEVES AND EXTENSION SOCKETS
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

SLITTERS
Bethlehem Steel Co., Bethlehem, Pa.
Bliss, E. W., Co., 53rd St. & Second Ave., Brooklyn 32, N. Y.
Cowles Tool Co., 2086 W. 110th St. Cleveland 2, O.
Paxson Machine Co., Salem, O.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Simonds Worden White Co., Dayton 7, O.
Wean Engineering Co., Inc., The, Warren, O.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

SLOTTERS
Consolidated Machine Tool Corp., 565 Blossom Road, Rochester 10, N. Y.
Rockford Machine Tool Co., 2400 Kishwaukee St., Rockford, Ill.

SMALL TOOLS

Bokum Tool Co., 14775 Wildemere Ave. Detroit 21, Mich.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O.
Woodworth, N. A., Co., 1300 E. Nine Mile Rd., Detroit 20, Mich.

SOAKING PITS

Amsler-Morton Co., The, Div. of Union Mining Co., Fulton Bldg., Pittsburgh 22, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Tate-Jones & Co., Inc., Leetsdale, Pa.

SOLDER

Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Kester Solder Co., 4222 Wrightwood Ave., Chicago 39, Ill.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
National Lead Co., 111 Broadway New York 6, N. Y.

SOLDER (Silver)

Handy & Harman, 82 Fulton St., New York 7, N. Y.
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.

SOLDERING EQUIPMENT

Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
Holden, A. F., Co., The, P.O. Box 1898, New Haven 8, Conn.
Lepel High Frequency Laboratories Inc., 39 W. 60th St., New York 23, N. Y.
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

SOLENOIDS (Electric)

Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
General Electric Co., Schenectady 5, N. Y.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.

SOLVENT (Degreasing)

Detrex Corporation, 13029 Hillview Ave., Detroit 4, Mich.
Gray-Mills Co., 1948-52 Ridge Ave., Evanston, Ill.
Kondor Products Corp., West Clifton Blvd. at Sloane, Cleveland 7, O.
Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co., Dept. S. Pennsalt Cleaner Div., Philadelphia 7, Pa.

SPECIAL MACHINERY—See MACHINERY (Special)

SPEED REDUCERS

Atlantic Gear Works, 200 Lafayette St., New York 12, N. Y.
Cleveland Worm & Gear Co., The, 3270 E. 80th St., Cleveland 4 O.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Foote, Brad, Gear Works, 1309 S. Cicero Ave., Cicero 50, Ill.
Foote Bros. Gear & Machine Co., 5225 S. Western Blvd., Chicago 9, Ill.
Grant Gear Works, 2nd & B Sts., Boston 27, Mass.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
James, D. O., Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Jones, W. A., Fdry. & Mach. Co., 4437 Roosevelt Rd., Chicago 24, Ill.
Link-Belt Co., 2045 W. Hunting Park Ave., Philadelphia 40, Pa.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Philadelphia Gear Works, Erie Ave. & G St., Philadelphia 34, Pa.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.
Twin Disc Clutch Co., 1379 Racine Ave., Racine, Wis.
Westinghouse Electric Corp., 200 McCandless Ave., Pittsburgh 1, Pa.

SPIEGELEISEN

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
New Jersey Zinc Co., 160 Front St., New York 7, N. Y.
Samuel, Frank & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

SPIKES (Screw)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Republic Steel Corp., Dept ST, Cleveland 4, O.

SPINDLES (Grinding)

Bryant Chucking Grinder Co., 257 Clinton St., Springfield, Vt.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Heald Machine Co., The, Worcester 6, Mass.

SPLICE BARS (Rail)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.

SPRAY BOOTHS

Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Metallizing Co. of America, 1330 W. Congress St., Chicago 7, Ill.

SPRINGS (*Also Stainless)

Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.
*American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
*Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Muehlhausen Spring Corp., 921 Michigan Ave., Logansport, Ind.
*Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Reliable Spring & Wire Forms Co., 3167 Fulton Rd., Cleveland 9, O.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N.Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.

SPRINGS (Coil & Elliptic)

Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.
Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.

SPRINGS (Compression)

*Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Barnes, Wallace, Co., The, Div. Associated Spring Corp. 97 Main St., Bristol, Conn.
Muehlhausen Spring Corp., 921 Michigan Ave., Logansport, Ind.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Reliable Spring & Wire Forms Co., 3167 Fulton Rd., Cleveland 9, O.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.

SPRINGS (Flat Coiled)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Athenia Steel Co., Clifton, N. J.
Muehlhausen Spring Corp., 921 Michigan Ave., Logansport, Ind.
Reliable Spring & Wire Forms Co., 3167 Fulton Rd., Cleveland 9, O.
Washburn Wire Co., 118th & Harlem River, New York 35, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.

SPRINGS (Oil Tempered—Flat)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Athenia Steel Co., Clifton, N. J.
Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Davis Brake Beam Co., Laurel Ave., & P. R. R., Johnstown, Pa.
Muehlhausen Spring Corp., 921 Michigan Ave., Logansport, Ind.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Reliable Spring & Wire Forms Co., 3167 Fulton Rd., Cleveland 9, O.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.

SPRINGS (Torsion)

Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Muehlhausen Spring Corp., 921 Michigan Ave., Logansport, Ind.
Reliable Spring & Wire Forms Co., 3167 Fulton Rd., Cleveland 9, O.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.

SPRINGS (Valve)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Muehlhausen Spring Corp., 921 Michigan Ave., Logansport, Ind.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Reliable Spring & Wire Forms Co., 3167 Fulton Rd., Cleveland 9, O.

SPRINKLERS (Automatic)

Blaw-Knox Sprinkler Div., Blaw-Knox Co., Blawnox, Pa.

SPROCKETS

Industrial Gear Mfg. Co., 4545 W. Van Buren St. Chicago 24, Ill.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Union Chain & Mfg. Co., Sandusky, O.

SPRUE CUTTERS

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.

STABILIZING EQUIPMENT (Temperature)

Motor Products Corp., Deep Freeze Div., 2309-7 Davis St., N. Chicago, Ill.

STACKS (Steel)—See BRIDGES, ETC.

STAINLESS STEEL—See listings marked "*" under individual product headings.

STAMPINGS

Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Metal Products Co., 5959 Linsdale Ave., Detroit 4, Mich.
American Tube & Stamping Plant, (Stanley Wks.), Bridgeport 7, Conn.
Atlas Metal Stamping Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Barnes, Wallace, Co., The, Div. Associated Spring Corp. 97 Main St., Bristol, Conn.
Brandt, Charles T., Inc., 1702 Ridgely St., Baltimore 30, Md.
Burgess-Norton Mfg. Co., 778 Peyton St., Geneva, Ill.
Davis Brake Beam Co., Laurel Ave. & P. R. R., Johnstown, Pa.
Erdle Perforating Co., 171 York St., Rochester 11, N. Y.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Grammes, L. F., & Sons, Inc., Allentown, Pa.
Homestead Valve Mfg. Co., P. O. Box 22, Coraopolis, Pa.
Hubbard, M. D., Spring Co., 42 Central Ave., Pontiac 12, Mich.
Master Products Co., 6400 Park Ave., Cleveland 5, O.
Mullins Mfg. Co., Warren, O.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.
Parish Pressed Steel Co., Reading, Pa.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Reliable Spring & Wire Forms Co., 3167 Fulton Rd., Cleveland 9, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Rheem Research Products, Inc., 206 Standard Oil Bldg., Baltimore 2, Md.
Scaife Co., Ann St., Oakmont, Pa.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Standard Products Co., The, 505 Boulevard Bldg., Detroit 2, Mich.
Stanley Works, The, New Britain & Bridgeport, Conn.
Toledo Stamping & Mfg. Co., 90 Fearing Blvd., Toledo 7, O.
Veeder-Root, Inc., Hartford 2, Conn.
Wagner, E. R., Mfg. Co., 4615 N. 32nd St., Milwaukee 9, Wis.
Whitehead Stamping Co., 1667 W. Lafayette Blvd., Detroit 16, Mich.
Worcester Pressed Steel Co., 508 Barber Ave., Worcester 6, Mass.
Wrought Washer Mfg. Co., 2108 S. Bay St., Milwaukee 7, Wis.

STAMPS (Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Cunningham, M. E. Co., 172 E. Carson St., Pittsburgh 19, Pa.
Matthews, Jas. H., & Co., 3973 Forbes St., Pittsburgh 13, Pa.

STAPLES (Wire)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria 7, Ill.
National Screw & Mfg. Co., The 2440 E. 75th St., Cleveland 4, O.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg. Birmingham 2, Ala.
Wickwire Brothers, 189 Main St. Cortland, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.
Worcester Wire Works, Worcester, Mass.
Youngstown Sheet & Tube Co., The Youngstown 1, O.

STARTERS (Electric Motor)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Guyan Machinery Co., Logan, W. Va.
Electric Controller & Mfg. Co., The 2698 East 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.
Square D. Co., 4041 N. Richards St., Milwaukee 12, Wis.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

STEEL (Alloy)

Alan Wood Steel Co., Conshohocken, Pa.
Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
American Petrometal Corp., Broadway at 11th St., Long Island City 2, N. Y.
American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Anchor Drawn Steel Co., Latrobe, Pa.
Babcock & Wilcox Tube Co., The Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.

STEEL (Alloy) (Con.)

Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Colonial Steel Div., Vanadium-Alloys Steel Co., Grant Bldg., Pittsburgh 19, Pa.
Columbia Steel Co., San Francisco 6, Calif.
Copperweld Steel Co., Warren, O.
Disston, Henry, & Sons, Inc. 626 Tacony, Philadelphia 35, Pa.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Frasse, Peter A., and Co., Inc., 17 Grand St., New York 13, N. Y.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Harrisburg Steel Corp., Harrisburg, Pa.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Jessop Steel Co., 584 Green St. Washington, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston, Mass.
Stanley Works, The, New Britain & Bridgeport, Conn.
Superior Steel Corp., Carnegie, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Washburn Wire Co., Phillipsdale, R. I.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The Youngstown 1, O.
Ziv Steel & Wire Co., 2945 W. Harrison St., Chicago 12, Ill.

STEEL (Alloy—Abrasive, Corrosion & Heat Resistant)

Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Bissett Steel Co., The, 945 E. 67th St., Cleveland 8, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Frasse, Peter A., and Co., Inc., 17 Grand St., New York 13, N. Y.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
International Nickel Co., Inc., The 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Michiana Products Corp., Michigan City, Ind.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Roebling's John A., Sons Co., Trenton 2, N. J.
Rustless Iron & Steel Corp., 3400 E. Chase St., Baltimore 13, Md.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Stanley Works, The, New Britain & Bridgeport, Conn.
Superior Steel Corp., Carnegie, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.

STEEL (Alloy—Cold Finished)

American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Athenia Steel Co., Clifton, N. J.
Benedict-Miller Inc., 216 Clifford St., Newark 5, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Copperweld Steel Co., Warren, O.
Craine-Schrage Steel Co., 1025 W. Oakwood Ave., Detroit 25, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Jessop Steel Co., 584 Green St., Washington, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Union Drawn Steel Div., of Republic Steel Corp., Massillon, O.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wyckoff Steel Co., P. O. Box 1256, Pittsburgh 30, Pa.

STEEL (Clad—Corrosion Resisting) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
*Copperweld Steel Co., Warren, O.
*Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
*Granite City Steel Co., Granite City, Ill.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Superior Steel Corp., Carnegie, Pa.

STEEL (Cold Finished)

American Petrometal Corp., Broadway at 11th St., Long Island City 2, N. Y.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Craine-Schrage Steel Co., 1025 W. Oakwood Ave., Detroit 25, Mich.
Drake Steel Supply Co., 10660 S. Alameda St., Los Angeles 2, Cal.
Firth-Sterling Steel Co., McKeesport, Pa.
Frasse, Peter A., & Co., Inc. 17 Grand St., New York 13, N. Y.
General Steel Warehouse Co., Inc. 1830 N. Kostner Ave., Chicago 39, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Purdy, A. R., Co., 790 Greenwich St., New York 14, N. Y.
Roebling's, John A., Sons Co., Trenton, N. J.
Ryerson, Jos. T., & Son., Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Union Drawn Steel Div. of Republic Steel Corp., Massillon, O.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wyckoff Steel Co., P. O. Box 1256, Pittsburgh 22, Pa.
Ziv Steel & Wire Co., 2945 W. Harrison St., Chicago 12, Ill.

STEEL (Die)

Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
Anchor Drawn Steel Co., Latrobe, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Colonial Steel Div., Vanadium-Alloys Steel Co., Grant Bldg., Pittsburgh 19, Pa.
Darwin & Milner, Inc., 1260 W. 4th St., Cleveland 13, O.
Disston, Henry, & Sons, Inc., 626 Tacony, Philadelphia 35, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Jessop Steel Co., 584 Green St., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Ziv Steel & Wire Co., 2945 W. Harrison St., Chicago 12, Ill.

STEEL (High Speed or Carbon Tool)

Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
Anchor Drawn Steel Co., Latrobe, Pa.
Benedict-Miller, Inc., 216 Clifford St., Newark 5, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
Bissett Steel Co., The, 947 E. 67th St., Cleveland 8, O.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Colonial Steel Div., Vanadium-Alloys Steel Co., Grant Bldg., Pittsburgh 19, Pa.
Copperweld Steel Co., Warren, O.
Craine-Schrage Steel Co., 1025 W. Oakwood Ave., Detroit 25, Mich.
Darwin & Milner, Inc., 1260 W. 4th St., Cleveland 13, O.
Disston, Henry & Sons, Inc., 626 Tacony, Philadelphia 35, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Holliday, W. J., & Co., Hammond, Ind.
Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Broach & Mach. Co., 5600 St. Jean, Detroit 13, Mich.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Sandvik Steel, Inc., 111 Eighth Ave., New York 11, N. Y.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Ziv Steel & Wire Co., 2945 W. Harrison St., Chicago 12, Ill.

STEEL (High Tensile, Low Alloy)

Alan Wood Steel Co., Conshohocken, Pa.
American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Cold Metal Products Co., The, 2131 Wilson Ave., Youngstown 1, O.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Holliday, W. J., & Co., Hammond, Ind.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

STEEL (Nitrided)

Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.

STEEL (Screw Stock)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Craine-Schrage Steel Co., 1025 W. Oakwood Ave., Detroit 25, Mich.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Holliday, W. J., & Co., Hammond, Ind.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Union Drawn Steel Div. of Republic Steel Corp., Massillon, O.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wyckoff Steel Co., P. O. Box 1256, Pittsburgh 30, Pa.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

STEEL (Specialties)

Jessop Steel Co., 584 Green St., Washington, Pa.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.

STEEL (Spring)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Athenia Steel Co., Clifton, N. J.
Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Bethlehem Steel Co., Bethlehem, Pa.
Cold Metal Products Co., The, 2131 Wilson Ave., Youngstown 1, O.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Purdy, A. R., Co., 790 Greenwich St., New York 14, N. Y.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Sandvik Steel Inc., 111 Eighth Ave., New York 11, N. Y.
Thomas Steel Co., The, Warren, O.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

STEEL (Stainless)—See listings marked "*" under individual product headings.

STEEL (Strip)

Drake Steel Supply Co., 10660 S. Alameda St., Los Angeles 2, Cal.

STEEL (Strip—Brass, Bronze, Copper and Nickel Coated)

American Nickeloid Co., 1310 Second St., Peru, Ill.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Stanley Works, The, New Britain & Bridgeport, Conn.
Thomas Steel Co., The, Warren, O.

STEEL (Strip—Hot or Cold Rolled) (*Also Stainless)

Alan Wood Steel Co., Conshohocken, Pa.
*Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
*American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
American Tube & Stamping Plant, (Stanley Wks.) Bridgeport 7, Conn.
Athenia Steel Co., Clifton, N. J.
Benedict-Miller Inc., 216 Clifford St., Newark 5, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
*Cold Metal Products Co., The, 2131 Wilson Ave., Youngstown 1, O.
Columbia Steel Co., San Francisco 6, Calif.
Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Enterprise Galvanizing Co., 3525 E. Cumberland St., Philadelphia 25, Pa.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
*Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill
Seneca Wire & Mfg. Co., The, Fostoria, O.
*Stanley Works, The, New Britain
*Superior Steel Corp., Carnegie, Pa. & Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Thomas Steel Co., The, Warren, O.
Todd Steel Corp., 370 Midland Ave., Detroit 3, Mich.
*United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N. Y.
Weirton Steel Co., Weirton, W. Va.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Worcester Pressed Steel Co., 508 Barber Ave., Worcester 6, Mass.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

STEEL (Strip—Lacquer Coated)

American Nickeloid Co., 1310 Second St., Peru, Ill.
Thomas Steel Co., The, Warren, O.

STEEL (Strip—Solder Coated)

Thomas Steel Co., The, Warren, O.

STEEL (Strip—Tin Coated)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Thomas Steel Co., The, Warren, O.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N. Y.

STEEL (Strip—Zinc Coated)

American Nickeloid Co., 1310 Second St., Peru, Ill.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Thomas Steel Co., The, Warren, O.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N. Y.

STEEL (Structural) (*Also Stainless)

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
American Petrometal Corp., Broadway at 11th St., Long Island City 2, N. Y.
Bedford Foundry & Mach. Co., Bedford, Ind.
Belmont Iron Works, 22nd St. and Washington Ave., Philadelphia 46, Pa.
Benedict-Miller Inc., 216 Clifford St., Newark 5, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
*Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Columbia Steel Co., San Francisco 6, Calif.
Drake Steel Supply Co., 10660 S. Alameda St., Los Angeles 2, Ca.
Duffin Iron Company, 37 W. Van Buren St., Chicago 5, Ill.
*Enterprise Galvanizing Co., 3525 E. Cumberland St., Philadelphia 25, Pa.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
*Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
*United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

STEEL BUILDINGS—See BRIDGES, BUILDINGS, ETC.

STEEL DOORS & SHUTTERS—See DOORS & SHUTTERS

STEEL FABRICATORS—See BRIDGES, BUILDINGS, ETC.

STEEL PLATE CONSTRUCTION

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Belmont Iron Works, 22nd St. and Washington Ave., Philadelphia 46, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Brandt, Charles T., Inc., 1702 Ridgely St., Baltimore 30, Md.
Duffin Iron Company, 37 W. Van Buren St., Chicago 5, Ill.
Federal Shipbuilding & Dry Dock Co., Kearney, N. J.
General American Transportation Corp., 514C Graybar Bldg., New York 17, N. Y.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Struthers Wells Corp., Titusville, Pa.

STELLITE

Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo, Ind.

STENCILS (Spray and Sand Blast)

Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

STEPS (Safety)

Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.

STOCK LINE RECORDERS

Otis Elevator Co., 260 11th Ave., New York 1, N. Y.

STOKERS

Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Steel Products Engineering Co., The, 1205 W. Columbia St., Springfield, O.
Westinghouse Electric Corp., Steam Div., Lester, Pa.

STONES (Honing, Polishing, Sharpening)

Carborundum Co., The, Niagara Falls, N. Y.
Norton Company, Worcester, 6, Mass.

STOPPERS (Cinder Notch)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Brosius, Edgar E., Co., Sharpsburg P. O., Pittsburgh 15, Pa.

STOPPERS (Rubber)

Rhoades, R. W., Metaline Co., Inc., 50-17 Fifth St., Long Island City 1, N. Y.

STORAGE BATTERIES—See BATTERIES (Storage)

STRAIGHTENING MACHINES—See BENDING & STRAIGHTENING MACHINES

STRAINERS (Duplex Pipe Line "Y" Type, Pressure or Suction Line)

Zurn, J. A., Mfg. Co., Erie, Pa.

STUDS (Locked In)

Bardwell & McAlister, Inc., P. O. Box 1310, Hollywood 28, Cal.

SWAGING MACHINES

Torrington Co., The, Torrington, Conn.

SWITCHES (Electric)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.
Square D Co., 6060 Rivard St., Detroit 11, Mich.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

TACHOMETERS

Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Stewart-Warner Corp. Instrument Div. 1828 W. Diversey Blvd., Chicago 14, Ill.
Sticht, Herman H., Co., 27 Park Place, New York 7, N. Y.
Veeder-Root, Inc., Hartford 2, Conn.
Westinghouse Electric Corp., Orange Ave., Newark 1, N. J.

TANK FITTINGS

Protectoseal Co., 1920 S. Western Ave., Chicago 8, Ill.

TANKS (Gas Auxiliary)

Webb Corp., The, Webb City, Mo.

TANKS (Pickling)

Goodrich, B. F., Co., The, Akron 19, O.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
National Lead Co., 111 Broadway, New York 6, N. Y.
Stanwood Corp., 4825 W. Cortland St., Chicago 39, Ill.
Tate-Jones & Co., Inc., Leetsdale, Pa.
Youngstown Welding & Eng. Co., 3711 Oakwood Ave., Youngstown 9, O.

TANKS (Plating)

Brandt, Charles T., Inc., 1702 Ridgely St., Baltimore 30, Md.
Goodrich, B. F., Co., The, Akron 19, O.
Siefen, J. J., Co., 5657 Lauderdale Ave., Detroit 9, Mich.
Tate-Jones & Co., Inc., Leetsdale, Pa.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

TANKS (Storage, Pressure, Riveted, Welded)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Brandt, Charles T., Inc., 1702 Ridgely St., Baltimore 30, Md.
General American Transportation Corp., 514C Graybar Bldg., New York 17, N. Y.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
National Annealing Box Co., Washington, Pa.
Protectoseal Co., 1920 S. Western Ave., Chicago 8, Ill.
Rheem Research Products, 206 Standard Oil Bldg., Baltimore 2, Md.
Scaife Co., Ann St., Oakmont, Pa.
Struthers Wells Corp., Titusville, Pa.
Tate-Jones & Co., Inc., Leetsdale, Pa.
Van Dorn Iron Works Co., 2685 E. 79th St., Cleveland 4, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

TANKS (Wood or Steel, Rubber or Lead Lined)

Brandt, Charles T., Inc., 1702 Ridgely St., Baltimore 30, Md.
Goodrich, B. F., Co., The, Akron 19, O.
Heil Engineering Co., 12903 Elmwood Ave., Cleveland 11, O.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
National Lead Co., 111 Broadway, New York 6, N. Y.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.

TAP EXTRACTORS

Clinton Machine Co., Clinton, Mich.

TAPES (Adhesive-Paper, Cloth, Fibre, Acetate, Film Backing)

General Electric Co., Sec. A-443-90 Tungar & Metallic Rectifier Div., Bridgeport 2, Conn.
Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.
Nox-Rust Corporation, 2461 S. Halsted St., Chicago 8, Ill.

TAPPING MACHINES

Haskins, R. G., Co., 615 California Ave., Chicago 12, Ill.
Moline Tool Co., 102 20th St., Moline, Ill.
Snyder Tool & Engineering Co., 3400 E. Lafayette St., Detroit 7, Mich.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

TAPS AND DIES

Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Landis Machine Co., Waynesboro, Pa.
Murchey Machine & Tool Co., 951 Porter St., Dept L, Detroit 26, Mich.

TAPS AND DIES (Con.)

National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.
Woodworth, N. A., Co., 1300 E. Nine Mile Rd., Detroit 20, Mich.

TERNE PLATE—See TIN OR TERNE PLATE

TESTING EQUIPMENT (Hydrostatic)

Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Pines Engineering Co., 600 Prairie St., Aurora, Ill.

TESTING EQUIPMENT (Laboratory)

Buehler Ltd., 165 W. Wacker Dr., Chicago 1, Ill.
DuMont, Allen B., Laboratories, Inc., 2 Main Ave., Passaic, N. J.
Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Hydraulic Machinery, Inc., 12825 Ford Rd., Dearborn, Mich.

TESTING EQUIPMENT (Portable)

Dravo Corp., 300 Penn Ave., Pittsburgh 22, Pa.
DuMont, Allen B., Laboratories, Inc., 2 Main Ave., Passaic, N. J.
Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.

TESTING MACHINERY (Materials)

Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
National Broach & Machine Co., 5600 St. Jean, Detroit 13, Mich.
Riehle Testing Machine Div., American Machine & Metals, Inc., E. Moline, Ill.

THERMIT WELDING EQUIPMENT AND MATERIALS

Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.

THERMOMETERS

Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.

THREAD CUTTING TOOLS

Bokum Tool Co., 14775 Wildemere Ave., Detroit 21, Mich.
Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Landis Machine Co., Waynesboro, Pa.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.
Pines Engineering Co., 600 Prairie St., Aurora, Ill.
Plan-O-Mill Corp., 1511 E. Eight Mile Rd., Hazel Park, Mich.

THREAD MILLING MACHINES

Murchey Machine & Tool Co., 951 Porter St., Dept L, Detroit 26, Mich.

THREADING MACHINES

Landis Machine Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., 951 Porter St., Dept L, Detroit 26, Mich.
Oster Mfg. Co., The, 2037 E. 61st Place, Cleveland 3, O.
Plan-O-Mill Corp., 1511 E. Eight Mile Rd., Hazel Park, Mich.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

TIE PLATES

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

TIN OR TERNE PLATE

American Rolling Mill Co., The, 1431 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

TIN PLATE MACHINERY

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore 2, Md.
Wean Engineering Co., Inc., The, Warren, O.

TITANIUM

Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.

TONGS (Automatic)

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.

TONGS (Chain Pipe)

Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

TONGS (Rail Handling)

Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 28, Ill.

TOOL BITS

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Anchor Drawn Steel Co., Latrobe, Pa.
Benedict-Miller, Inc., 216 Clifford St., Newark 5, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
Bokum Tool Co., 14775 Wildemere Ave., Detroit 21, Mich.
Black Drill Co., 1400 E. 222nd St. Cleveland 17, O.
Colonial Steel Div., Vanadium-Alloys Steel Co., Grant Bldg., Pittsburgh 19, Pa.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Jessop Steel Co., 584 Green St., Washington, Pa.
Vanadium-Alloys Steel Co., Latrobe, Pa.

TOOL BITS (High Speed)

Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
Benedict-Miller, Inc., 216 Clifford St., Newark 5, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
Bokum Tool Co., 14775 Wildemere Ave., Detroit 21, Mich.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Disston, Henry, & Sons, Inc., 626 Tacony, Philadelphia 35, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo, Ind.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Jessop Steel Co., 584 Green St., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Ziv Steel & Wire Co., 2945 W. Harrison St., Chicago 12, Ill.

TOOL DESIGNING & BUILDING

Acme Aluminum Alloys Inc., 232 Findlay St., Dayton 3, O.
Atlas Tool & Designing Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Bone Tool & Gauge Co., 9910 Freeland Ave., Detroit 27, Mich.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.

TOOL HOLDERS

Apex Machine & Tool Co., 1025 S. Patterson Blvd., Dayton 1, O.
Bokum Tool Co., 14775 Wildemere Ave., Detroit 21, Mich.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

TOOLS (Carbide Tipped)

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Bokum Tool Co., 14775 Wildemere Ave., Detroit 21, Mich.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Spe-D-Cut Tool Co., 9th & Lyons Sts., Hannibal, Mo.
Tung-Tip Tools Div., Lowell & Grayson, Monrovia, Cal.
Vascoloy-Ramet Corp., N. Chicago, Ill.
Ziv Steel & Wire Co., 2945 W. Harrison St., Chicago 12, Ill.

TOOLS (Diamond)

Diamond Tool Co., 933 E. 41st St., Chicago 15, Ill.

TOOLS (Electric)

Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.

TOOLS (Hand)

New Britain Machine Co., New Britain, Conn.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

TOOLS (Non-Sparking, Safety)

Ampco Metal, Inc., Dept S6, Milwaukee 4, Wis.

TOOLS (Pneumatic)

Cleveland Pneumatic Tool Co., The, 3781 E. 77th St., Cleveland 5, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Ingersoll-Rand Co., Phillipsburg, N. J.
Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.

TOOLS (Precision, Metal Cutting, etc.)

Acme Aluminum Alloys Inc., 232 Findlay St., Dayton 3, O.
Bokum Tool Co., 14775 Wildemere Ave., Detroit 21, Mich.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Clark, Robert H., Co., 9330 Santa Monica Blvd., Beverly Hills, Cal.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Lewthwaite, T. H., Machine Co., Inc., 311 E. 47th St., New York 17, N. Y.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Micromatic Hone Corp., 1800 Schoolcraft Ave., Detroit 4, Mich.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.
Spe-D-Cut Tool Co., 9th & Lyons Sts., Hannibal, Mo.
Tung-Tip Tools Div., Lowell & Grayson, Monrovia, Cal.
Vascoloy-Ramet Corp., N. Chicago, Ill.
Vinco Corp., Schaefer and Joy Rds., Detroit 27, Mich.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.
Woodworth, N. A., Co., 1300 E. Nine Mile Rd., Detroit 20, Mich.

TORCHES & BURNERS (Acetylene, Blow, Oxy-Acetylene)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

TORQUE CONVERTERS (Hydraulic)

Twin Disc Clutch Co., 1379 Racine Ave., Racine, Wis.

TOWBOATS

Commercial Iron Works, P. O. Box 2230, Portland 14, Ore.
Ingalls Iron Works Co., The, Birmingham 2, Ala.

TOWERS (Transmission)

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.

TRACK ACCESSORIES

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Foster, L. B. Co., Inc., P. O. Box 1647, Pittsburgh, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

TRACK BOLTS—See BOLTS (Track)

TRAILERS

Easton Car & Construction Co., Easton, Pa.
Mercury Manufacturing Company, The, 4140 S. Halsted St., Chicago 9, Ill.
Ohio Galvanizing & Mfg. Co., Penn St., Niles, O.

TRAMRAILS

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.

TRANSFORMERS (Electric)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
General Electric Co., Schenectady 5, N. Y.
Westinghouse Electric Corp., Sharon, Pa.

TRANSFORMERS (Resistance Welding)

General Electric Co., Schenectady 5, N. Y.
Progressive Welder Co., 3050 E. Outer Dr., Detroit 12, Mich.
Taylor-Winfield Corp., Warren, O.

TRANSMISSIONS (Automotive)

Clark Equipment Co., Buchanan, Mich.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
James, D. O. Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.

TRANSMISSIONS—VARIABLE SPEED

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Link-Belt Co., 2045 W. Hunting Park Ave., Philadelphia 40, Pa.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

TREADS (Safety)

Alan Wood Steel Co., Conshohocken, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.
Norton Company, Worcester 6, Mass.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tri-Lok Co., 5515 Butler St., Pittsburgh 1, Pa.

TROLLEYS

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Chisholm-Moore Hoist Corp., 118 Fremont Ave., Tonawanda, N. Y.
Ford Chain Block Div., American Chain & Cable Co., Inc., 2nd & Diamond Sts., Philadelphia 22, Pa.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Wright Mfg. Div. of American Chain & Cable Co., Inc., York, Pa.

TRUCK CRANES

Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.
Northwest Engineering Co., 28 E. Jackson Blvd., Chicago 4, Ill.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.
Thew Shovel Co., The, Lorain, O.

TRUCKS (Barrel)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Palmer-Shile Co., 7100 W. Jefferson Ave., Detroit 17, Mich.
Revolvator Co., 391 86th St., N. Bergen, N. J.
Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y.

TRUCKS (Boom)

Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.

TRUCKS (Dump-Industrial)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Clark Tructractor Div. Clark Equipment Co., Battle Creek, Mich.
Crescent Truck Co., 1100 Willow St., Lebanon, Pa.
Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.
Easton Car & Construction Co., Easton, Pa.
Towmotor Corp., 1223 E. 152nd St., Cleveland 10, O.

TRUCKS (Hand Lift)

Revolvator Co., 391 86th St., N. Bergen, N. J.
Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y.

TRUCKS (Hydraulic Lift)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.
Clark Tructractor Div. Clark Equipment Co., Battle Creek, Mich.
Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.
Mercury Manufacturing Company, The, 4140 S. Halsted St., Chicago 9, Ill.
Towmotor Corp., 1223 E. 152nd St., Cleveland 10, O.

TRUCKS (Industrial)

Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.
Clark Tructractor Div. Clark Equipment Co., Battle Creek, Mich.
Crescent Truck Co., 1100 Willow St., Lebanon, Pa.
Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.
Easton Car & Construction Co., Easton, Pa.
Mercury Manufacturing Company, The, 4140 S. Halsted St., Chicago 9, Ill.
Ohio Galvanizing & Mfg. Co., Penn St., Niles, O.
Palmer-Shile Co., 7100 W. Jefferson Ave., Detroit 17, Mich.
Rapids Standard Co., Inc., The, Peoples Natl. Bank Bldg., Grand Rapids 2, Mich.
Revolvator Company, 391 86th St., N. Bergen, N. J.
Ross Carrier Corp., Benton Harbor, Mich.
Towmotor Corp., 1223 E. 152nd St., Cleveland 10, O.
Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y.

TRUCKS (Lift)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.
Clark Tructractor Div., Clark Equipment Co., Battle Creek, Mich.
Crescent Truck Co., 1100 Willow St., Lebanon, Pa.
Easton Car & Construction Co., Easton, Pa.
Elwell-Parker Electric Co., 4501 St. Clair Ave., Cleveland 14, O.
Jaeger Machine Co., The, 550 W. Spring St., Columbus 15, O.
Mercury Manufacturing Company, The, 4140 S. Halsted St., Chicago 9, Ill.
Revolvator Company, 391 86th St., N. Bergen, N. J.
Ross Carrier Corp., Benton Harbor, Mich.
Towmotor Corp., 1223 E. 152nd St., Cleveland 10, O.
Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y.

TRUCKS (Straddle)

Ross Carrier Corp., Benton Harbor, Mich.

TRUCKS AND TRACTORS (Electric Industrial)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.
Crescent Truck Co., 1100 Willow St., Lebanon, Pa.
Easton Car & Construction Co., Easton, Pa.
Elwell-Parker Electric Co., 4501 St. Clair Ave., Cleveland 14, O.
Mercury Manufacturing Company, The, 4140 S. Halsted St., Chicago 9, Ill.
Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y.

TRUCKS AND TRACTORS (Gasoline or Diesel—Industrial)

Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.
Crescent Truck Co., 1100 Willow St., Lebanon, Pa.
Elwell-Parker Electric Co., 4501 St. Clair Ave., Cleveland 14, O.
Mercury Manufacturing Company, The, 4140 S. Halsted St., Chicago 9, Ill.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.
Towmotor Corp., 1223 E. 152nd St., Cleveland 10, O.

TUBE FITTINGS

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Stewart-Warner Corp., Alemite Div., 1879 W. Diversey Blvd., Chicago 14, Ill.
Trabon Engineering Corp., 1818 E. 40th St., Cleveland 3, O.
Weatherhead Co., The, 300 East 131st St., Cleveland 8, O.

TUBE MILL EQUIPMENT

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
Wean Engineering Co., Inc., The, Warren, O.
Yoder Co., The, 5500 Walworth Ave, Cleveland 2, O.

TUBE WELDING MACHINES

Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

TUBES (Alloy Steel) (*Also Stainless)

*Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
*National Annealing Box Co., Washington, Pa.

TUBES (Bimetal)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
Tube Reducing Corp., Wallington, N. J.

TUBES (Boiler)

Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Bissett Steel Co., The, 945 E. 67th St., Cleveland 8, O.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Michigan Seamless Tube Co., South Lyon, Mich.
Michigan Steel Tube Products Co., 9450 Buffalo St., Detroit 12, Mich.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., Shelby, O.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Standard Tube Co., The, 14600 Woodward Ave., Detroit 3, Mich.
Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tubular Alloy Steel Corp., Gary, Ind.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

TUBES (Brass, Bronze, Copper, Nickel, Nickel Silver)

Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

TUBES (Combustion)

Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester 6, Mass.

TUBES (High Carbon)

Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Drake Steel Supply Co., 10660 S. Alameda St., Los Angeles 2, Cal.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., Shelby, O.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Standard Tube Co., The, 14600 Woodward Ave., Detroit 3, Mich.
Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tube Reducing Corp., Wallington, N. J.

TUBES (Seamless Steel)

Tube Reducing Corp., Wallington, N. J.

TUBING (Alloy Steel) (*Also Stainless)

*Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
*Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
*Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bissett Steel Co., The, 945 E. 67th St., Cleveland 8, O.
*Columbia Steel Co., San Francisco 6, Calif.
*Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Michigan Seamless Tube Co., South Lyon, Mich.
Michigan Steel Tube Products Co., 9450 Buffalo St., Detroit 12, Mich.
*National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., Shelby, O.
*Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
*Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tube Reducing Corp., Wallington, N. J.
*Tubular Alloy Steel Corp., Gary, Ind.
*United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
*Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

TUBING (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Dow Chemical Co., The, Midland, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

TUBING (Brass, Silicon-Bronze, Copper or Monel)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
Bundy Tubing Co., 10951 Hern Ave., Detroit 13, Mich.
Calumet and Hecla Consolidated Copper Co., Wolverine Tube Div., 1439 Central Ave., Detroit 9, Mich.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Revere Copper & Brass Inc., 230 Park Ave., New York 17, N. Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

TUBING (Condenser)

Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Michigan Seamless Tube Co., South Lyon, Mich.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.

TUBING (Flexible Metal)

American Brass Co., The, Waterbury 88, Conn.
American Metal Hose Branch of The American Brass Co., Waterbury 88, Conn.
Chicago Metal Hose Corp., 1315 S. Third St., Maywood, Ill.
Pennsylvania Flexible Metallic Tubing Co., 7250 Powers Lane, Philadelphia 42, Pa.

TUBING (Mechanical)

Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Drake Steel Supply Co., 10660 S. Alameda St., Los Angeles 2, Cal.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Michigan Seamless Tube Co., South Lyon, Mich.
Michigan Steel Tube Products Co., 9450 Buffalo St., Detroit 12, Mich.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Standard Products Co., The, 505 Boulevard Bldg., Detroit 2, Mich.
Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tube Reducing Corp., Wallington, N. J.

TUBING (Rubber)

Boston Woven Hose & Rubber Co., P.O. Box 1071, Boston 3, Mass.
Goodrich, B. F., Co., The, Akron 19, O.
Standard Products Co. The, 505 Boulevard Bldg., Detroit 2, Mich.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

TUBING (Seamless)

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Drake Steel Supply Co., 10660 S. Alameda St., Los Angeles 2, Cal.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.

TUBING (Seamless, Aluminum)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

TUBING (Seamless Flexible Metal)

American Metal Hose Branch of The American Brass Co., Waterbury 88, Conn.

TUBING (Seamless Steel)

Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Columbia Steel Co., San Francisco 6, Calif.
Drake Steel Supply Co., 10660 S. Alameda St., Los Angeles 2, Cal.
Frasse, Peter A., and Co., Inc., 17 Grand St., New York 13, N. Y.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Michigan Seamless Tube Co., South Lyon, Mich.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., Shelby, O.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Pyerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tubular Alloy Steel Corp., Gary, Ind.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

TUBING (Square, Rectangular and Shapes) (*Also Stainless)

Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Drake Steel Supply Co., 10660 S. Alameda St., Los Angeles 2, Cal.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Michigan Steel Tube Products Co., 9450 Buffalo St., Detroit 12, Mich.
Michigan Seamless Tube Co., South Lyon, Mich.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., Shelby, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Standard Tube Co., The, 14600 Woodward Ave., Detroit 3, Mich.
*Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.

TUBING (Tool Steel)

Sandvik Steel, Inc., 111 Eighth Ave., New York 11, N. Y.

TUBING (Welded)

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Drake Steel Supply Co., 10660 S. Alameda St., Los Angeles 2, Cal.

TUBING (Welded Steel) (*Also Stainless)

*Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
*Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
*American Metal Products Co., 5959 Linsdale Ave., Detroit 4, Mich.
*American Welding & Mfg. Co., The, Warren, O.
Babcock & Wilcox Tube Co., The, Welded Tube Div., Alliance, O.
Bundy Tubing Co., 10951 Hern Ave., Detroit 13, Mich.
*Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Frasse, Peter A., and Co., Inc., 17 Grand St., New York 13, N. Y.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Michigan Steel Tube Products Co., 9450 Buffalo St., Detroit 12, Mich.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., Shelby, O.
*Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Revere Copper & Brass Inc., 230 Park Ave., New York 17, N. Y.
Standard Tube Co., The, 14600 Woodward Ave., Detroit 3, Mich.
*Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.
*Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

TUBULAR PRODUCTS

Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
American Metal Products Co., 5959 Linsdale Ave., Detroit 4, Mich.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bundy Tubing Co., 10951 Hern Ave., Detroit 13, Mich.
Michigan Seamless Tube Co., South Lyon, Mich.
Michigan Steel Tube Products Co., 9450 Buffalo St., Detroit 12, Mich
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., Shelby, O.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Standard Tube Co., The, 14600 Woodward Ave., Detroit 3, Mich.
Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tubular Alloy Steel Corp., Gary, Ind.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

TUMBLING BARRELS (Coke Testing)

Brosius, Edgar E., Co., Sharpsburg P. O., Pittsburgh 15, Pa.

TUNGSTEN CARBIDE

Bissett Steel Co., The, 945 E. 67th St., Cleveland 8, O.
Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo, Ind.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.

TUNGSTEN CARBIDE (Tools and Dies)

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.

TUNGSTEN METAL AND ALLOYS

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.

TURBINES (Steam)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
DeLaval Steam Turbine Co., Trenton, N. J.
General Electric Co., Schenectady 5, N. Y.
Sturtevant, B. F., Co., Hyde Park, Boston 36. Mass.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

TURBO BLOWERS—See BLOWERS

TURNTABLES

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Bethlehem Steel Co., Bethlehem, Pa.
Easton Car & Construction Co., Easton, Pa.

TURRET LATHES—See LATHES (Turret)

TURRET LATHE CUTTERS (Carbide Tipped)

Firth-Sterling Steel Co., McKeesport, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.

TWIST DRILLS

Clark Equipment Co., Buchanan, Mich.
Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O.

TYPE (Steel)

Cunningham, M. E., Co., 172 E. Carson St., Pittsburgh 19, Pa.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

VACUUM CLEANERS

General Electric Co., Sec. A-443-90, Tungar & Metallic Rectifier Div., Bridgeport 2, Conn.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.

VACUUM TUBES (Industrial Power)

Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
General Electric Co., Schenectady 5, N. Y.

VALVE CONTROLS

Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Philadelphia Gear Works, Erie Ave. & G St., Philadelphia 34, Pa.

VALVE CONTROLS (Motor-Operated Units)

Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.

VALVES (Air Blast)

Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13. Ill.
Palmer-Shile Co., 7100 W. Jefferson Ave., Detroit 17, Mich.

VALVES (Blast Furnace)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Brosius, Edgar E., Co., Sharpsburg P. O., Pittsburgh 15, Pa.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.

VALVES (Blow-off)

Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Homestead Valve Mfg. Co., P. O. Box 22, Coraopolis, Pa.
Palmer-Shile Co., 7100 W. Jefferson Ave., Detroit 17, Mich.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

VALVES (Butterfly)

Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.

VALVES (Check)

Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Reading-Pratt & Cady Div. of American Chain & Cable Co., Inc., Reading, Pa.
Watson-Stillman Co., Roselle, N. J.
Weatherhead Co., The, 300 E. 131st St., Cleveland 8, O.
Zurn, J. A., Mfg. Co., Erie, Pa.

VALVES (Chemical)

Goodrich, B. F., Co., The, Akron 19, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

VALVES (Compressed Gas Cylinder)

Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.

VALVES (Control—Air or Hydraulic)

Anker-Holth Mfg. Co., 2723 Connors St., Port Huron, Mich.
Baldwin Southwark Div., The, Baldwin Locomotive Works, Philadelphia 42, Pa.
Cleveland Pneumatic Tool Co., The, 3781 E. 77th St., Cleveland 5, O.
Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Denison Engineering Co., The, 1168 Dublin Rd., Columbus 16, O.
Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Homestead Valve Mfg. Co., P. O. Box 22, Coraopolis, Pa.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.
Vickers, Inc., 1480 Oakman Blvd., Detroit 32, Mich.
Weatherhead Co., The, 300 E. 131st St., Cleveland 8, O.

VALVES (Electrically Operated)

Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.
R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.

VALVES (Foot)

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.
Wood, R. D., Co., 400 Chestnut St., Philadelphia 5, Pa.

VALVES (Gas and Air Reversing)

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.

VALVES (Gate)

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Reading-Pratt & Cady Div. of American Chain & Cable Co., Inc., Reading, Pa.

VALVES (Globe)

Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Reading-Pratt & Cady Div. of American Chain & Cable Co., Inc., Reading, Pa.
Watson-Stillman Co., Roselle, N. J.

VALVES (Goggle)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.

VALVES (Hydraulic)

Adel Precision Products Corp., 10345 Van Owen St., Burbank, Cal.
Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.
Homestead Valve Mfg. Co., P. O. Box 22, Corsopolis, Pa.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.
Vickers, Inc., 1480 Oakman Blvd., Detroit 32, Mich.
Watson-Stillman Co., Roselle, N. J.
Wood, R. D., Co., 400 Chestnut St., Philadelphia 5, Pa.

VALVES (Needle)

Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia 42, Pa.
Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Reading-Pratt & Cady Div. of American Chain & Cable Co., Inc., Reading, Pa.
Watson-Stillman Co., Roselle, N. J.

VALVES (Plug)

Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Homestead Valve Mfg. Co., P. O. Box 22, Corsopolis, Pa.

VALVES (Steam, Water)

Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.
Reading-Pratt & Cady Div. of American Chain & Cable Co., Inc., Reading, Pa.

VANADIUM

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.

VENTILATING EQUIPMENT

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Burt Mfg. Company, The, 400 S. High St., Akron 11, O.
DeBothezat Fans, Div. American Machine & Metals Co., East Moline, Ill.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.
Sturtevant, B. F. Co., Hyde Park, Boston 36, Mass.

VENTILATING EQUIPMENT (Engine)

Donaldson Co., 666 Pelham St., St. Paul 4, Minn.

VENTILATORS (Roof)

Burt Mfg. Company, The, 400 High St., Akron 11, O.
DeBothezat Fans, Div. American Machine & Metals Co., East Moline, Ill.

VENTS (Safety)

Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Protectoseal Co., 1920 S. Western Ave., Chicago 8, Ill.
Zurn, J. A., Mfg. Co., Erie, Pa.

VIADUCTS (Steel)—See BRIDGES, ETC.

VIBRATION DAMPENERS

Goodrich, B. F. Co., The, Akron 19, O.
Harris Products Co., 5105 Cowan Ave., Cleveland 4, O.
Korfund Co., Inc., The, 48-37 32nd Place, Long Island City 1, N. Y.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

VIBRATION ELIMINATORS, PIPING

Power Piping Div., Blaw-Knox Co., Beaver & Western Aves., Pittsburgh 2, Pa.

VIBRATION ISOLATORS (Steel Springs)

Korfund Co., Inc., The, 48-37 32nd Place, Long Island City 1, N. Y.

VIBRATORS (Electric)

Syntron Co., 370 Lexington Ave., Homer City, Pa.

VISES (Hydraulic)

Air Hydraulics Div., Beyer Machine Co., Jackson, Mich.

VISES (Pneumatic)

Air Hydraulics Div., Beyer Machine Co., Jackson, Mich.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.

WALKWAYS—See FLOORING—(Steel)

WASHERS (Iron and Steel)

Beall Tool Co., East Alton, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Garrett, George K., Co., 1421 Chestnut St., Philadelphia 2, Pa
Grammes, L. F., & Sons, Inc., Allentown, Pa.
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
Master Products Co., 6400 Park Ave., Cleveland 5, O.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
U. S. Automatic Corp., Amherst, O.
Whitehead Stamping Co., 1667 W. Lafayette Blvd., Detroit 16, Mich.
Wrought Washer Mfg. Co., 2103 S Bay St., Milwaukee 7, Wis.

WASHERS (Lead)

Master Products Co., 6400 Park Ave., Cleveland 5, O.
National Lead Co., 111 Broadway, New York 6, N. Y.
Wrought Washer Mfg. Co., 2103 S. Bay St., Milwaukee 7, Wis.

WASHERS (Lock)

Beall Tool Co., East Alton, Ill.
Garrett, George K., Co., 1421 Chestnut St., Philadelphia 2, Pa.
Wrought Washer Mfg. Co., 2103 S. Bay St., Milwaukee 7, Wis.

WASHERS (Nonferrous and Stainless)

Beall Tool Co., East Alton, Ill.
Garrett, George K., Co., 1421 Chestnut St., Philadelphia 2, Pa.
Grammes, L. F., & Sons, Inc., Allentown, Pa.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
Master Products Co., 6400 Park Ave., Cleveland 5, O.
Shenango-Penn Mold Co., 444 W. Third St., Dover, O.
U. S. Automatic Corp., Amherst, O
Wrought Washer Mfg. Co., 2103 S. Bay St., Milwaukee 7, Wis.

WASHERS (Spring)

Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Beall Tool Co., East Alton, Ill.
Garrett, George K., Co., 1421 Chestnut St., Philadelphia 2, Pa.
Master Products Co., 6400 Park Ave., Cleveland 5, O.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Wrought Washer Mfg. Co., 2103 S. Bay St., Milwaukee 7, Wis.

WATER COOLERS

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
General Electric Co., (Air Conditioning & Commercial Refrigeration Div. Sec. 4412), Bloomfield, N. J.
Niagara Blower Co., Dept. S-54, 6 E. 45th St., New York 17, N. Y.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Westinghouse Electric Corp., 653 Page Blvd., Springfield 2, Mass

WATER FILTRATION & SOFTENING EQUIPMENT

Adams, R. P., Co., Inc., 75 Chicago St., Buffalo 4, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Carborundum Co., The, Niagara Falls, N. Y.
Syntron Co., 370 Lexington Ave., Homer City, Pa.

WELDED SHEET METAL ASSEMBLIES

Aircraft Mechanics, Inc., Nevada St., Colorado Springs, Colo.
Brandt, Charles T., Inc., 1702 Ridgely St., Baltimore 30, Md.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Van Dorn Iron Works Co., 2685 E. 79th St., Cleveland 4, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

WELDED STEEL CONSTRUCTION

Aircraft Mechanics, Inc., Nevada St., Colorado Springs, Colo.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Brandt, Charles T., Inc., 1702 Ridgely St., Baltimore 30, Md.
Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.
Duffin Iron Company, 37 W. Van Buren St., Chicago 5, Ill.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Tate-Jones & Co., Inc., Leetsdale, Pa
Van Dorn Iron Works Co., 2685 E. 79th St., Cleveland 4, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

WELDERS (Electric—Arc)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Ergolyte Mfg. Co., 3627 N. Lawrence St., Philadelphia 40, Pa.
General Electric Co., Schenectady 5, N. Y.
Guyan Machinery Co., Logan, W. Va.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Hobart Bros. Co., The, Box ST 941, Troy, O.
Lee, K. O., Co, Aberdeen, S. Dak
Lincoln Electric Co., The, Cleveland 1, O.
Mid-States Equipment Co., Welding Div., 2425 S. Michigan Ave., Chicago 16, Ill.
Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

WELDERS (Electric Resistance)

Federal Machine & Welder Co., 202 Dana Ave., Warren, O.

WELDING

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
American Welding & Mfg. Co., The, Warren, O.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Cleveland Welding Co., The, W. 117th St. & Berea Rd., Cleveland 7, O.
Ergolyte Mfg. Co., 3627 N. Lawrence St., Philadelphia 40, Pa.
Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Lincoln Electric Co., The, Cleveland 1, O.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.
Scaife Co., Ann St., Oakmont, Pa.
Van Dorn Iron Works Co., 2685 E. 79th St., Cleveland 4, O.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

WELDING (Hard Surface)

Farrel-Birmingham Co., Inc., Ansonia, Conn.
Redford Engineering Co., 21200 E. 8 Mile Rd., Detroit 19, Mich.

WELDING (Resistance)

Algoma Products Co., 3080 E. Outer Dr., Detroit 12, Mich.
American Welding & Mfg. Co., The, Warren, O.
Cleveland Welding Co., The, W. 117th St. & Berea Rd., Cleveland 7, O.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.
Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.
Sciaky Bros., 4915 W. 67th St., Chicago 38, Ill.
Taylor-Winfield Corp., Warren, O.

WELDING (Stainless)

Aircraft Mechanics, Inc., Nevada St., Colorado Springs, Colo.
Arcos Corp., 318 Gulf Bldg., Philadelphia 8, Pa.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

WELDING (Thermit)

Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.

WELDING AND CUTTING APPARATUS AND SUPPLIES (Electric)

Air Reduction, 60. E. 42nd St., New York 17, N. Y.
Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.
Cutler-Hammer Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Hobart Bros. Co., The, Box ST 941, Troy, O.
Lincoln Electric Co., The, Cleveland 1, O.
McKay Co., The, Pittsburgh 22, Pa.
Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.
Mid-States Equipment Co., Welding Div., 2425 S. Michigan Ave., Chicago 16, Ill.
Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Calif.
United States Steel Supply Co., P. O. Box MM, Chicago, 90, Ill.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

WELDING AND CUTTING APPARATUS AND SUPPLIES (Oxy-Acetylene)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Mid-States Equipment Co., Welding Div., 2425 S. Michigan Ave., Chicago 16, Ill.
Oakite Products, Inc., 34E Thames St., New York 6, N. Y.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Calif.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

WELDING DIES (Flash)

Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.

WELDING FIXTURES

Algoma Products Co., 3080 E. Outer Dr., Detroit 12, Mich.
Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.
Taylor-Winfield Corp., Warren, O.

WELDING POSITIONERS

Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.

WELDING RODS (Alloy)
(*Also Stainless)

*Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
*Alloy Rods Co., York, Pa.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Agile Corp., 5800 Hough Ave., Cleveland 3, O.
*American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Arcos Corp., 318 Gulf Bldg., Philadelphia 8, Pa.
*Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Champion Rivet Co., The, 11200 Harvard Ave., Cleveland 5, O.
*Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
*Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
International Nickel Co. Inc., The, 67 Wall St., New York 5, N. Y.
Lincoln Electric Co., Cleveland 1, O.
*Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
*McKay Co., The, Pittsburgh 22, Pa.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Mid-States Equipment Co., Welding Div., 2425 S. Michigan Ave., Chicago 16, Ill.
*Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Reid-Avery Co., The, Cleveland & Chesapeake Sts., Baltimore 22, Md.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Welding Equipment & Supply Co., 223 Leib St., Detroit 7, Mich.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

WELDING RODS (Bronze)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
American Agile Corp., 5800 Hough Ave., Cleveland 3, O.
American Brass Co., The, Waterbury 88, Conn.
Ampco Metal, Inc., Dept. S6, Milwaukee 4, Wis.
Arcos Corp., 318 Gulf Bldg., Philadelphia 8, Pa.
Bridgeport Brass Co., Bridgeport 2, Conn.
Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Mid-States Equipment Co., Welding Div., 2425 S. Michigan Ave., Chicago 16, Ill.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Titan Metal Mfg. Co., Bellefonte, Pa.
Welding Equipment & Supply Co., 223 Leib St., Detroit 7, Mich.

WELDING RODS (Cast Iron)

American Agile Corp., 5800 Hough Ave., Cleveland 3, O.
Champion Rivet Co., The, 11200 Harvard Ave., Cleveland 5, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Lincoln Electric Co., The, Cleveland 1, O.
Welding Equipment & Supply Co., 223 Leib St., Detroit 7, Mich.

WELDING RODS (Hard Facing or Hard Surfacing)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
American Agile Corp., 5800 Hough Ave., Cleveland 3, O.
Arcos Corp., 318 Gulf Bldg., Philadelphia 8, Pa.
Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Haynes Stellite Co., 30 E. 42nd St., New York 17, N. Y.
Lincoln Electric Co., The, Cleveland 1, O.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Mid-States Equipment Co., Welding Div., 2425 S. Michigan Ave., Chicago 16, Ill.
Mir-O-Col Alloy Co., 2416-30 E. 53rd St., Los Angeles 11, Cal.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

WELDING RODS (Magnesium)

American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Dow Chemical Co., The, Midland, Mich.

WELDING RODS (Tool Steel)

American Agile Corp., 5800 Hough Ave., Cleveland 3, O.
Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Hobart Bros. Co., The, Box ST 941, Troy, O.
Lincoln Electric Co., The, Cleveland 1, O.
McKay Co., The, Pittsburgh 22, Pa.
Welding Equipment & Supply Co., 223 Leib St., Detroit 7, Mich.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

WELDING RODS OR WIRE

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Agile Corp., 5800 Hough Ave., Cleveland 3, O.
American Brass Co., The, Waterbury 88, Conn.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Ampco Metal, Inc., Dept. S6, Milwaukee 4, Wis.
Arcos Corp., 318 Gulf Bldg., Philadelphia 8, Pa.
Benedict-Miller Inc., 216 Clifford St., Newark 5, N. J.
Bridgeport Brass Co., Bridgeport 2, Conn.
Champion Rivet Co., The, 11200 Harvard Ave., Cleveland 5, O.
Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y.
General Electric Co., Schenectady 5, N. Y.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Hobart Bros. Co., The, Box ST 941, Troy, O.
Keystone Steel & Wire Co., Peoria 7, Ill.
Lincoln Electric Co., The, Cleveland 1, O.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
McKay Co., The, Pittsburgh 22, Pa.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Metallizing Co. of America, 1330 W. Congress St., Chicago 7, Ill.
Mid-States Equipment Co., Welding Div., 2425 S. Michigan Ave., Chicago 16, Ill.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Reid-Avery Co., The, Cleveland & Chesapeake Sts., Baltimore 22, Md.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Welding Equipment & Supply Co., 223 Leib St., Detroit 7, Mich.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.
Wickwire Brothers, 189 Main St., Cortland, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

WELDING TIPS (Spot)

Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.

WELDING WHEELS (Seam)

Mallory, P. R., & Co., Inc., 3029 E. Washington St., Indianapolis 6, Ind.

WELL WATER SUPPLY SYSTEMS

Layne & Bowler, Inc., Memphis 8, Tenn.

WHEELS (Buffing and Polishing)

Chicago Wheel & Mfg. Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.

WHEELS (Car, Locomotive or Truck)

American Welding & Mfg. Co., The, Warren, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Clark Equipment Co., Buchanan, Mich.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.

WINCHES (Electric)

Commercial Iron Works, P. O. Box 2230, Portland 14, Oreg.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.

WINCHES (Gasoline, Diesel)

Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.

WIRE (Alloy Steel) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Dept. S-25, Brackenridge, Pa.
*American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
*Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
*Columbia Steel Co., San Francisco 6, Calif.
*Firth-Sterling Steel Co., McKeesport, Pa.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
National-Standard Co., Niles, Mich.
*Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
*Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
*Republic Steel Corp., Dept. ST, Cleveland 4, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Rustless Iron & Steel Corp., 3400 E. Chase St., Baltimore 13, Md.
Seneca Wire & Mfg. Co., Fostoria, O.

WIRE (Aluminum)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Titan Metal Mfg. Co., Bellefonte, Pa.

WIRE (Annealed, Bright, Galvanized, Tinned, Coppered)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco 6, Calif.
Continental Steel Corp., Kokomo, Ind.
Johnson Steel & Wire Co., Worcester 1, Mass.
Keystone Steel & Wire Co., Peoria 7, Ill.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., Fostoria, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Wheeling Steel Corp., Wheeling, W. Va.
Wickwire Brothers, 189 Main St., Cortland, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.
Worcester Wire Works, Worcester, Mass.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

WIRE (Barb)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria 7, Ill.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.

WIRE (Bead, Braid, & Tapes)

National-Standard Co., Niles, Mich.

WIRE (Brass, Bronze, Phosphor Bronze, Silicon Bronze, Copper or Nickel Silver)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
Revere Copper & Brass Co., Inc., 230 Park Ave., New York 17, N. Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Seymour Manufacturing Co., The, 51 Franklin St., Seymour, Conn.
Titan Metal Mfg. Co., Bellefonte, Pa.

WIRE (Cold Drawn)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Johnson Steel & Wire Co., Inc., Worcester 1, Mass.
Keystone Steel & Wire Co., Peoria 7, Ill.
National-Standard Co., Niles, Mich.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., Fostoria, O.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.
Worcester Wire Works, Worcester, Mass.

WIRE (High Carbon)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
National-Standard Co., Niles, Mich.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., Fostoria, O.
Union Wire Rope Corp., 21st and Manchester Ave., Kansas City 3, Mo.
Washburn Wire Co., 118th and Harlem River, New York 35, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.
Worcester Wire Works, Worcester, Mass.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

WIRE (Magnet)

Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.

WIRE (Music)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Johnson Steel & Wire Co., Inc., Worcester 1, Mass.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Washburn Wire Co., 118th St. and Harlem River, New York 35, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.
Worcester Wire Works, Worcester, Mass.

WIRE (Round, Flat, Square, Special Shapes)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Athenia Steel Co., Clifton, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Johnson Steel & Wire Co., Inc., Worcester 1, Mass.
Keystone Steel & Wire Co., Peoria 7, Ill.
National-Standard Co., Niles, Mich.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., Fostoria, O.
Washburn Wire Co., 118th St. and Harlem River, New York 35, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.
Worcester Wire Works, Worcester, Mass.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

WIRE (Spring)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Barnes, Wallace, Co., The, Div. Associated Spring Corp., Bristol, Conn.
Bethlehem Steel Co., Bethlehem, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
Muehlhausen Spring Corp., 921 Michigan Ave., Logansport, Ind
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., Fostoria, O.
Union Wire Rope Corp., 21st and Manchester Ave., Kansas City 3, Mo.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.
Worcester Wire Works, Worcester, Mass.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

WIRE (Stapling)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria 7, Ill.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., Fostoria, O.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.
Worcester Wire Works, Worcester, Mass.

WIRE (Welding)—See WELDING RODS OR WIRE

WIRE AND CABLE (Electric)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.
Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
General Electric Co., Sec. A-443-90, Tungar & Metallic Rectifier Div., Bridgeport 2, Conn.
Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.
Roebling's, John A., Sons Co., Trenton 2, N. J.

WIRE CLOTH

Buffalo Wire Works Co., Inc., 437 Terrace Rd., Buffalo 2, N. Y.
Cyclone Fence Div., American Steel & Wire Co., Waukegan, Ill.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Rolock, Inc., 1350 Kings Highway, Fairfield, Conn.
Seneca Wire & Mfg. Co., Fostoria, O.
Wickwire Brothers, 189 Main St., Cortland, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.

WIRE COILING TOOLS (Cemented Carbide)

Firth-Sterling Steel Co., McKeesport, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.

WIRE FORMS, SHAPES AND SPECIALTIES

Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.
American Chain Div. American Chain & Cable Co., Inc., York, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Wire Works Co., Inc., 437 Terrace Rd., Buffalo 2, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
Grammes, L. F., & Sons, Inc., Allentown, Pa.
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
Keystone Steel & Wire Co., Peoria 7, Ill.
Muehlhausen Spring Corp., 921 Michigan Ave., Logansport, Ind.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Reliable Spring & Wire Forms Co., 3167 Fulton Rd., Cleveland 9, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.

WIRE FORMING MACHINERY

Nilson, A. H., Machine Co., The, Bridgeport 5, Conn.
Wean Engineering Co., Inc., The, Warren, O.

WIRE GALVANIZING EQUIPMENT (Electro)

Meaker Co., The, 1635 S. 55th St., Chicago 50, Ill.

WIRE MILL EQUIPMENT

Crucible Steel Co. of America, 405 Lexington Ave., New York 17, N. Y.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Lewis Machine Co., 3450 E. 76th St., Cleveland 4, O.
Morgan Construction Co., Worcester 5, Mass.
Shuster, F. B., Mfg. Co., Inc., The, New Haven 9, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

WIRE NAILS—See NAILS

WIRE PRODUCTS (*Also Stainless)

*American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
*Buffalo Wire Works Co., Inc., 437 Terrace Rd., Buffalo 2, N. Y.
Continental Steel Corp., Kokomo, Ind.
Grammes, L. F., & Sons, Inc., Allentown, Pa.
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
Leschen, A., & Sons Rope Co., 5909 Kennerly Ave., St. Louis 12, Mo.
Muehlhausen Spring Corp., 921 Michigan Ave., Logansport, Ind.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
*Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Wickwire Brothers, 189 Main St., Cortland, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.

WIRE ROPE

American Cable Div. of American Chain & Cable Co., Inc., Wilkes-Barre, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco 6, Calif.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Hazard Wire Rope Div. of American Chain & Cable Co., Inc., Wilkes-Barre, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Leschen, A., & Sons Rope Co., 5909 Kennerly Ave., St. Louis 12, Mo.
Macwhyte Co., 2912 14th Ave., Kenosha, Wis.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Union Wire Rope Corp., 21st and Manchester Ave., Kansas City 3, Mo.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.

WIRE ROPE FITTINGS

American Cable Div. of American Chain & Cable Co., Wilkes-Barre, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Hazard Wire Rope Div., American Chain & Cable Co., Wilkes-Barre, Pa.
Leschen, A., & Sons Rope Co., 5909 Kennerly Ave., St. Louis 12, Mo.
Macwhyte Co., 2912 14th Ave., Kenosha, Wis.
Roebling's, John A., Sons Co., Trenton 2, N. J.

WIRE ROPE SLINGS

American Cable Div. American Chain & Cable Co., Inc., Wilkes-Barre, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Hazard Wire Rope Div., American Chain & Cable Co., Inc., Wilkes-Barre, Pa.
Leschen, A., & Sons Rope Co., 5909 Kennerly Ave., St. Louis 12, Mo.
Macwhyte Co., 2912 14th Ave., Kenosha, Wis.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Union Wire Rope Corp., 21st and Manchester Ave., Kansas City 3, Mo.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y.

WIRE STRAIGHTENING AND CUTTING MACHINERY

Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Lewis Machine Co., 3450 E. 76th St., Cleveland 4, O.
Shuster, F. B., Mfg. Co., Inc., New Haven 9, Conn.
Shuster, F. B., Mfg. Co., Inc., The, New Haven 9, Conn.
Watson-Stillman Co., Roselle, N. J.
Ave., Elizabeth, N. J.

WORK REST BLADES (Centerless Grinder)

Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

WRENCHES (Drop Forged)

Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

WRENCHES (Torque)

Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

X-RAY EQUIPMENT and SUPPLIES

Eastman Kodak Co., 343 State St., Rochester 4, N. Y.
Westinghouse Electric Corp., Baltimore 3, Md.

ZINC

American Zinc, Lead & Smelting Co., 943 Paul Brown Bldg., St. Louis 1, Mo.
New Jersey Zinc Co., 160 Front St., New York 7, N. Y.

ZINC ALLOYS

New Jersey Zinc Co., 160 Front St., New York 7, N. Y.

ZINC OXIDE

American Zinc, Lead & Smelting Co., 943 Paul Brown Bldg., St. Louis 1, Mo.
Anaconda Sales Company, 25 Broadway, New York 4, N. Y.
New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.

ZINC (Rolled Sheets, Strip, Coils)

New Jersey Zinc Co., 160 Front St., New York 7, N. Y.

ZINC SLABS

American Zinc, Lead & Smelting Co., 943 Paul Brown Bldg., St. Louis 1, Mo.
Anaconda Sales Company, 25 Broadway, New York 4, N. Y.
New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.

ZIRCONIUM METAL AND ALLOYS

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.

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Ace Mfg. Corp.,
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Acme Aluminum Alloys, Inc.,
232 Findlay St., Dayton 3, O.
Adams, R. P. Co., Inc.,
75 Chicago St., Buffalo, 4, N. Y.
Adel Precision Products Corp.,
10345 Van Owen Ave.,
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Advance Foundry Co., The,
100 Parnell Ave., Dayton 3, O.
Advance Pressure Castings Co.,
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Aetna-Standard Engineering Co.,
The, Home Savings Bank Bldg.,
Youngstown 1, O.
Agalov Tubing Co.,
1027 Newark Ave.,
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Chattanooga 5, Tenn.
Air Reduction,
60 E. 42nd St.,
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Aircraft Mechanics, Inc.,
Nevada St.,
Colorado Springs, Colo.
Ajax Electric Co.,
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Philadelphia 23, Pa.
Ajax Electrothermic Corp.,
Ajax Park, Trenton 5, N. J.
Ajax Flexible Coupling Co.,
4 English St., Westfield, N. Y.
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Albert, L., & Son,
Whitehead Rd., Trenton, N. J.
Aldrich Pump Co., The,
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311 W. Huron St.,
Ann Arbor, Mich.
Alloy Rods Co.,
York, Pa.
Aluminum Co. of America,
2112 Gulf Bldg.,
Pittsburgh 19, Pa.
Aluminum Industries, Inc.,
2438 Beekman St.,
Cincinnati 25, O.
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5800 Hough Ave., Cleveland 3, O.
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443 Central Ave.,
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American Brass Co., The,
Waterbury 88, Conn.
American Bridge Co.,
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American Cast Iron Pipe Co.,
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1721 Gulf Bldg.,
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American Metal Products Co.,
5959 Linsdale Ave.,
Detroit 4, Mich.
American MonoRail Co., The
13102 Athens Ave.,
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American Nickeloid Co.,
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Broadway at 11th St.,
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Warren, O.
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St. Louis 1, Mo.
Ampco Metal Inc.,
Dept. 56, Milwaukee 4, Wis.
Amsler-Morton Co., The., Div. of Union Mining Co., Fulton Bldg.,
Pittsburgh 22, Pa.
Anaconda Wire & Cable Co.,
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Anker-Holth Mfg. Co.,
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Port Huron, Mich.
Apex Machine & Tool Co., The,
1025 S. Patterson Blvd.,
Dayton 1, O.
Apollo Steel Co.,
2243-2244 Oliver Bldg.,
Pittsburgh 22, Pa.
Arcos Corp.,
318 Gulf Bldg.,
Philadelphia 8, Pa.
Armstrong-Blum Mfg. Co.,
5700 Bloomingdale Ave.,
Chicago 39, Ill.
Associated Engineers, Inc.,
230 E. Berry St.,
Ft. Wayne 2, Ind.
Atlantic Gear Works,
200 Lafayette St.,
New York 12, N. Y.
Atlas Car & Mfg. Co., The,
1100 Ivanhoe Road,
Cleveland 10, O.
Atlas Drop Forge Co.,
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Atlas Lumnite Cement Co., Dept. 2,
Chrysler Bldg.,
New York 17, N. Y.
Atlas Tool & Designing Co.,
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B

Babcock & Wilcox Co., The,
85 Liberty St., New York 6, N. Y.
Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St.,
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Babcock & Wilcox Co., The, Tube Div., 85 Liberty St.,
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Bailey, Wm. M., Co.,
Magee Bldg., Pittsburgh 22, Pa.
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Toledo 10, O.
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Baker-Raulang Co., The,
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715 Spencer St., Toledo 1, O.
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C

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Crucible Steel Co. of America,
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Curtis Mfg. Co., 1996 Kienlen
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Trenton, N. J.
Delta Mfg. Co., The,
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Denison Engineering Co., The,
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deSanno A. P., & Son, Inc.,
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Dresser Mfg. Div., Dresser Industries,
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Drop Forging Association,
Hanna Bldg., Cleveland 15, O.
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Chicago 5, Ill.
DuMont, Allen B., Laboratories Inc.,
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Buffalo 7, N. Y.

E

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Eastman Kodak Co.,
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Easton Car & Construction Co.,
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Eberhardt-Denver Co.,
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Edison, Thomas A., Inc.,
W. Orange, N. J.
Electric Controller & Mfg. Co., The,
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Electric Eye Equipment Co.,
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Electric Furnace Co., The,
440 W. Wilson St., Salem, O.
Electric Storage Battery Co., The,
19th St. & Allegheny Ave.,
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Electro Metallurgical Co.,
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New York 17, N. Y.
Electro Refractories & Alloys Corp.,
Vars Bldg., Buffalo 2, N. Y.
Elwell-Parker Electric Co., The,
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Enterprise Galvanizing Co.,
Almond & E. Firth Sts.,
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171 York St., Rochester 11, N. Y.
Ergolyte Manufacturing Co.,
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Philadelphia 40, Pa.
Erie Foundry Co.,
W. 12th St., Erie, Pa.
Erie Steel Construction Co.,
Erie, Pa.
Euclid Crane & Hoist Co., The,
1365 Chardon Rd., Euclid, O.
Eureka Fire Brick Works,
1100 B. F. Jones Law Bldg.,
Pittsburgh 19, Pa.
Eutectic Welding Alloys Co.,
40 Worth St., New York 13, N. Y.
Ex-Cell-O Corp.,
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Detroit 6, Mich.

F

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Fairbanks, Morse & Co.,
Fairbanks-Morse Bldg.,
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Farrel-Birmingham Co. Inc.,
Ansonia, Conn.
Farval Corp., The,
3249 E. 80th St., Cleveland 4, O.
Fate-Root-Heath Co., Plymouth, O.
Federal Machine & Welder Co.,
202 Dana St., Warren, O.
Federal Screw Works,
3401 Martin St., Detroit 10, Mich.
Federal Telephone & Radio Corp.,
Div. International Telephone &
Telegraph Corp., 32 Central Ave.,
Newark 1, N. J.
Ferry Cap & Set Screw Co.,
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Cleveland 13, O.
Finkl, A., & Sons Co.,
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Firth-Sterling Steel Co.,
McKeesport, Pa.
Fitchburg Grinding Machine Co.,
Fitchburg, Mass.
Follansbee Steel Corp.,
Third & Liberty Sts.,
Pittsburgh 30, Pa.
Foote, Brad, Gear Works,
1309 S. Cicero Ave., Cicero 50, Ill.
Foote Bros. Gear & Machine Co.,
5225 S. Western Blvd.,
Chicago 9, Ill.
Fort Pitt Bridge Works,
Keystone Hotel, Pittsburgh 22, Pa.
Foster, Frank B.,
Oliver Bldg., Pittsburgh 22, Pa.
Foster, L. B., Co., Inc.
P.O. Box 1647, Pittsburgh, Pa.
Fostoria Pressed Steel Corp.,
Fostoria, O.
Frasse, Peter A., & Co., Inc.,
17 Grand St., New York 13, N. Y.
Fuller Brush Co., The,
Industrial Div., 3582 Main St.,
Hartford 2, Conn.

G

Galland-Henning Mfg .Co.,
2747 S. 31st St.,
Milwaukee 7, Wis.
Garrett, George K., Co.,
1421 Chestnut St.,
Philadelphia 2, Pa.
Gates Rubber Co., The,
999 S. Broadway,
Denver 17, Colo.
General Abrasive Co., Inc.,
College Ave. & Hyde Park Blvd.,
Niagara Falls, N. Y.
General American Transportation
Corp., 514c Graybar Bldg.,
New York 17, N. Y.
General Blower Co.,
404 N. Peoria St.,
Chicago 22, Ill.
General Chemical Co.,
40 Rector St., New York 6, N. Y.
General Electric Co.,
Schenectady 5, N. Y.
General Electric Co., Air Condition-
ing & Commercial Refrigeration
Dept., Bloomfield, N. J.
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Bridgeport 2, Conn.
General Steel Warehouse Co. Inc.,
1830 N. Kostner Ave.,
Chicago 39, Ill.
Gerding Bros.,
5 E. Third St., Cincinnati 2, O.
Gisholt Machine Co.,
1217 E. Washington St.,
Madison 3, Wis.
Gits Brothers Mfg. Co.,
1836 S. Kilbourn Ave.,
Chicago 23, Ill.
Globe Brick Co.,
East Liverpool, O.
Goodrich, B. F. Co., The,
Akron 19, O.
Gordon, Claud S., Co.,
3000 S. Wallace St.,
Chicago 16, Ill.
Grammes, L. F., & Sons, Inc.,
Allentown, Pa.
Granite City Steel Co.,
Granite City, Ill.
Grant Gear Works,
2nd & B Sts., Boston 27, Mass.
Graton & Knight Co.,
322 Franklin St.,
Worcester 4, Mass.
Graver Tank & Mfg. Co., Inc.,
332 S. Michigan Ave.,
Chicago 4, Ill.
Gray-Mills Co.,
1948-52 Ridge Ave., Evanston, Ill.
Great Lakes Steel Corp.,
Tecumseh Rd., Detroit 18, Mich.
Greenlee Brothers & Co.,
1927 Mason Ave., Rockford, Ill.
Gruendler Crusher & Pulverizer Co.,
2915-17 N. Market St.,
St. Louis 6, Mo.
Gulf Oil Corp.,
Gulf Bldg., Pittsburgh 30, Pa.
Guyan Machinery Co.,
Logan, W. Va.

H

Hagan, George J., Co.,
2400 E. Carson St.,
Pittsburgh 3, Pa.
Hall, C. M., Lamp Co.,
1005 E. Hancock St.,
Detroit 7, Mich.
Handy & Harman
82 Fulton St., New York 7, N. Y.
Hanlon-Gregory Galvanizing Co.,
5515 Butler St., Pittsburgh 1, Pa.
Hanna Engineering Works,
1765 Elston Ave., Chicago 22, Ill.
Hanna Furnace Corp., The,
Penobscot Bldg., Detroit 26, Mich.
Hannifin Mfg. Co.,
621-631 S. Kolmar Ave.,
Chicago 24, Ill.
Hansen Mfg. Co.,
1786 E. 27th St.,
Cleveland 14, O.
Hanson-Van Winkle-Munning Co.,
Matawan, N. J.
Harbison-Walker Refractories Co.,
1800 Farmers Bank Bldg.,
Pittsburgh 22, Pa.
Harnischfeger Corp.,
4411 W. National Ave.,
Milwaukee 14, Wis.
Harper Electric Furnace Corp.,
1450 Buffalo Ave.,
Niagara Falls, N. Y.
Harper, H. M., Co., The,
2646 Fletcher St., Chicago 18, Ill.
Harrington & King Perforating Co.,
The, 5634 Fillmore St.,
Chicago 44, Ill.
Harris Products Co.,
5105 Cowan Ave., Cleveland 4, O.
Harrisburg Steel Corp.,
Harrisburg, Pa.
Haskins, R. G., Co.,
615 S. California Ave.,
Chicago 12, Ill.
Hassall, John, Inc.,
402 Oakland St.,
Brooklyn 22, N. Y.
Haynes Stellite Corp.,
Harrison & Lindsay Sts.,
Kokomo, Ind.
Hays Corp., The,
960 Eighth St.,
Michigan City, Ind.
Heald Machine Co., The,
New Bond St., Worcester 6, Mass.
Hedstrom, Oscar W., Corp.,
4824 W. Division St.,
Chicago 51, Ill.
Heil Engineering Co.,
12903 Elmwood Ave.,
Cleveland 11, O.
Hendrick Mfg. Co.,
37 Dundaff St.,
Carbondale, Pa.
Heppenstall Co.,
4620 Hatfield St., Pittsburgh 1, Pa.
Hercules Powder Co., Inc.,
Wilmington 99, Del.
Hetz Construction Co.,
Warren, O.
Hevi Duty Electric Co.,
4212 W. Highland Blvd.,
Milwaukee 1, Wis.
Hindley Mfg. Co.,
Valley Falls, R. I.
Hobart Brothers Co., The,
Box St. 65, Troy, O.
Holcroft & Co.,
6545 Epworth Blvd.,
Detroit 10, Mich.
Holden, A. F., Co., The,
P. O. Box 1898,
New Haven 8, Conn.
Holliday, W. J., & Co.,
137th & Polk Sts., Hammond, Ind.
Homestead Valve Mfg. Co.,
P. O. Box 22, Coraopolis, Pa.
Hood Refining Co.,
N. Hamilton Ave.,
Greensburg, Pa.
Hoover Ball & Bearing Co.,
Ann Arbor, Mich.
Horsburgh & Scott Co., The,
5112 Hamilton Ave.,
Cleveland 14, O.
Houghton, E. F., & Co.,
303 W. Lehigh Ave.,
Philadelphia 33, Pa.
Hubbard, M. D., Spring Co.,
425 Central Ave.,
Pontiac 12, Mich.
Huck Mfg. Co.,
2480 Bellevue Ave.,
Detroit 7, Mich.
Hughes-Keenan Co., The,
585 Newman St., Mansfield, O.
Hyatt Bearings Div., General Motors
Corp., Harrison, N. J.
Hyde Park Fdry & Machine Co.,
Hyde Park, Pa.
Hydraulic Machinery Inc.,
12825 Ford Road,
Dearborn, Mich.

Hydraulic Press Mfg. Co., The,
Mt. Gilead, O.
Hydropress, Inc.,
570 Lexington Ave.,
New York 22, N. Y.
Hy-Test Div., International Shoe Co.,
1509 Washington Ave.,
St. Louis 3, Mo.

I

Illinois Clay Products Co.,
214 Barber Bldg., Joliet, Ill.
Illinois Gear & Machine Co.,
2108 N. Natchez Ave.,
Chicago 35, Ill.
Illinois Tool Works,
2501 N. Keeler Ave.,
Chicago 39, Ill.
Independent Pneumatic Tool Co.,
600 W. Jackson Blvd.,
Chicago 6, Ill.
Industrial Abrasives, Inc.,
Dept. 5-N
3724 W. 38th St.,
Chicago 32, Ill.
Industrial Brownhoist Corp.,
Bay City, Mich.
Industrial Gear Mfg. Co.,
4545 E. Van Buren St.,
Chicago 24, Ill.
Industrial Oven Engineering Co.,
The, 11621 Detroit Ave.,
Cleveland 2, O.
Industrial Steels Inc.,
246-250 Burt St.,
Cambridge 41, Mass.
Ingalls Iron Works Co., The,
Birmingham 2, Ala.
Ingersoll-Rand Co.,
11 Broadway, New York 4, N. Y.
Ingersoll Steel & Disc Div.,
Borg-Warner Corp.,
310 So. Michigan Ave.,
Chicago 4, Ill.
Inland Steel Co.,
38 S. Dearborn St., Chicago 3, Ill.
International Graphite & Electrode
Corp., St. Mary's, Pa.
International Nickel Co., Inc.,
67 Wall St., New York 5, N. Y.
International Rustproof Corp.,
12507 Plover Ave.,
Cleveland 7, O.
Iron & Steel Products, Inc.,
Hegewisch Sta., Chicago 33, Ill.
Irwin Mfg. Co., Inc.,
Garland, Pa.

J

J-B Engineering Sales Co.,
3101 East St.,
New Haven 3, Conn.
Jackson Iron & Steel Co.,
Jackson, O.
Jaeger Machine Co., The,
550 W. Spring St.,
Columbus 15, O.
James, D. O., Mfg. Co.,
1140 W. Monroe St.,
Chicago 7, Ill.
Jeffrey Mfg. Co.,
889-99 N. Fourth St.,
Columbus 16, O.
Jessop Steel Co.,
584 Green St., Washington, Pa.
Johns-Manville Corp.,
22 E. 40th St.,
New York 16, N. Y.
Johnson Bronze Co.,
550 Mill St., New Castle, Pa.
Johnson Gas Appliance Co.,
626 "E" St., N. W.,
Cedar Rapids, Iowa.
Johnson Steel & Wire Co.,
Worcester 1, Mass.
Johnston & Jennings Co., The,
877 Addison Rd.,
Cleveland 14, O.
Jones & Lamson Machine Co.,
Springfield, Vt.
Jones & Laughlin Steel Corp.,
Jones & Laughlin Bldg.,
Pittsburgh 30, Pa.
Jones, W. A., Fdry. & Mach. Co.,
4437 W. Roosevelt Rd.,
Chicago 24, Ill.
Joyce Machine Co.,
2080 Wheatsheaf Lane,
Philadelphia 24, Pa.

K

Kane & Roach, Inc.,
Niagara & Shonnard Sts.,
Syracuse, N. Y.
Kardong Brothers, Inc.,
346 Buchanan St.,
Minneapolis 13, Minn.
Kaydon Engineering Corp., Thre,
Muskegon, Mich.
Kearney & Trecker Corp.,
6784 National Ave.,
Milwaukee 14, Wis.
Kelly Machinery Co.,
2524 W. Madison St.,
Chicago 12, Ill.
Kemp, C. M., Mfg. Co.,
405 E. Oliver St.,
Baltimore 2, Md.
Kennametal Inc.,
200 Lloyd Ave., Latrobe, Pa.
Kester Solder Co.,
4222 Wrightwood Ave.,
Chicago 39, Ill.
Keystone Steel & Wire Co.,
Peoria 7, Ill.
Kidde, Walter, & Co., Inc.,
140 Cedar St., New York 6, N. Y.
Kinnear Mfg. Co., The,
818 Fields Ave., Columbus 16, O.
Kold-Hold Mfg. Co.,
444 N. Grand Ave.,
Lansing 4, Mich.
Kondor Products Corp.,
West Clifton Blvd. at Sloane,
Cleveland 7, O.
Koppers Co.,
Koppers Bldg., Pittsburgh 19, Pa.
Korfund Co., Inc., The,
48-37 32nd Place,
Long Island City 1, N. Y.
Kropp Forge Co.,
5301 W. Roosevelt Rd.,
Chicago 50, Ill.

L

Ladish Drop Forge Co.,
Cudahy, Wis.
Lake City Malleable Co., The,
5026 Lakeside Ave.,
Cleveland 14, O.
Lakeside Steel Improvement Co.,
The, 5418 Lakeside Ave.,
Cleveland 14, O.
Laminated Shim Co., Inc.,
87 Union St., Glenbrook, Conn.
Lamson & Sessions Co., The,
1971 W. 85th St.,
Cleveland 2, O.
Landis Machine Co., Inc.,
Waynesboro, Pa.
Landis Tool Co.,
Waynesboro, Pa.
Lansing Engineering Co.,
934-36 Clark St., Lansing, Mich.
Latrobe Electric Steel Co.,
Latrobe, Pa.
Layne & Bowler, Inc.,
Memphis 8, Tenn.
Lebanon Steel Foundry,
Lebanon, Pa.
LeBlond, R. K., Machine Tool Co.,
Cincinnati 8, O.
Lee, K. O., Co.,
Aberdeen, S. Dakota.
Leeds & Northrup Co.,
4957 Stenton Ave.,
Philadelphia 44, Pa.
Lehmann Machine Co.,
Choteau at Grand,
St. Louis 3, Mo.
Lepel High Frequency Laboratories,
Inc., 39 W. 60th St.,
New York 23, N. Y.
Leschen, A., & Sons, Rope Co.,
5909 Kennerly Ave.,
St. Louis 12, Mo.
Lester-Phoenix, Inc.,
2629 Church St., Cleveland 13, O.
Levinson Steel Sales Co.,
33 Pride St., Pittsburgh 19, Pa.
Lewis Fdry. & Machine Co.,
P. O. Box 1586,
Pittsburgh 30, Pa.
Lewis Machine Co.,
3450 E. 76th St.,
Cleveland 4, O.
Lewthwaite, T. H., Machine Co.,
311 E. 47th St.,
New York 17, N. Y.
Lincoln Electric Co., The,
Cleveland 1, O.
Lindbergh Engineering Co.,
2466 N. Hubbard St.,
Chicago 12, Ill.
Linde Air Products Co.,
30 E. 42nd St.,
New York 17, N. Y.
Link-Belt Co.,
307 N. Michigan Ave.,
Chicago 1, Ill.
Littell, F. J., Machine Co.,
4165 N. Ravenswood Ave.,
Chicago 13, Ill.
Lodge & Shipley Machine Tool Co.,
The, 3055 Colerain Ave.,
Cincinnati 25, O.
Logan Engineering Co.,
4901 W. Lawrence Ave.,
Chicago 30, Ill.
Logemann Brothers Co.,
3126 Burleigh St.,
Milwaukee 10, Wis.
Lord Baltimore Hotel,
Baltimore, Md.
Lovejoy Flexible Coupling Co.,
4973 W. Lake St.,
Chicago 44, Ill.
Lubriplate Div., Fiske Bros. Refining
Co., Newark 5, N. J., Toledo 3, O.

Mc

McKay Co., The,
Pittsburgh 22, Pa.
McKay Machine Co., The,
546 W. Rayen St.,
Youngstown 2, O.
McKee, Arthur G., & Co.,
2300 Chester Ave.,
Cleveland 1, O.
McQuay-Morris Mfg. Co.,
2320 Marconi Ave.,
St. Louis 10, Mo.

M

Mackintosh-Hemphill Co.,
9th & Bingham St.,
Pittsburgh 3, Pa.
Macklin Co.,
Jackson, Mich.
Macwhyte Company,
2912 14th Ave., Kenosha, Wis.
Maehler, Paul Co., The,
2208 W. Lake St.,
Chicago 12, Ill.
Mahon, R. C., Co., The,
8650 Mt. Elliott Ave.,
Detroit 11, Mich.
Mahr Mfg. Co., Div. of Diamond
Iron Works, Inc., 1728—2nd St.
N. Minneapolis, Minn.
Mall Tool Co.,
7774 S. Chicago Ave.,
Chicago 19, Ill.
Mallory, P. R., & Co. Inc.,
3029 E. Washington St.,
Indianapolis, Ind.
Manheim Mfg. & Belting Co.,
Manheim, Pa.
Markal Co.,
631 N. Western Ave.,
Chicago 12, Ill.
Master Electric Co., The,
100 Davis Ave., Dayton 1, O.
Master Products Co., The,
6400 Park Ave., Cleveland 5, O.
Masterform Tool Co.,
2532 Irving Park Blvd.,
Chicago 18, Ill.
Mathews Conveyer Co.,
Ellwood City, Pa
Matthews, Jas. H., & Co.,
3978 Forbes St.,
Pittsburgh 13, Pa.
Mattison Machine Works,
Rockford, Ill.
Mead Specialties Co., The,
15 S. Market St.,
Chicago 6, Ill.
Meaker Co., The,
1635 S. 55th Ave.,
Chicago 50, Ill.
Medart Co., The,
3500 DeKalb St.,
St. Louis 18, Mo.
Meehanite Research Institute,
Pershing Bldg.,
New Rochelle, N. Y.
Mercury Mfg. Co.,
4140 S. Halsted St.,
Chicago 9, Ill.
Merrill Brothers,
56-04 Arnold Ave.,
Maspeth, N. Y.
Mesta Machine Co.,
P. O. Box 1466,
Pittsburgh 30, Pa.
Metal & Thermit Corp.,
120 Broadway,
New York 5, N. Y.
Michiana Products Corp.,
Michigan City, Ind.
Michigan Seamless Tube Co.,
South Lynn, Mich.
Michigan Steel Tube Products Co.,
9450 Buffalo St.,
Detroit 12, Mich.
Michigan Tool Co.,
7171 E. McNichols Rd.,
Detroit 12, Mich.
Micromatic Hone Corp.,
8100 Schoolcraft Ave.,
Detroit 4, Mich.
Mid-States Equipment Co.,
2425 S. Michigan Ave.,
Chicago 16, Ill.
Midvale Co., The,
Nicetown, Philadelphia 40, Pa.
Milwaukee Foundry Equipment Co.,
3938 W. Pierce St.,
Milwaukee 4, Wis.
Minnesota Mining & Mfg. Co.,
900 Fauquier St.,
St. Paul 6, Minn.
Mir-O-Col Alloy Co.,
2416-30 E. 53rd St.,
Los Angeles 11, Cal.
Moline Tool Co.,
102 20th St., Moline, Ill.
Moltrup Steel Products Co.,
Beaver Falls, Pa.
Molybdenum Corp. of America,
Grant Bldg., Pittsburgh 19, Pa.
Monarch Machine Tool Co., The,
Sidney, O.
Monarch Steel Co.,
545 W. McCarty St.,
Indianapolis 7, Ind.
Montgomery, Harry E., Metal Spin-
ning Works, 329 E. 1st St.,
Tulsa, Okla.
Moraine Products Div., General Mo-
tors Corp., Dayton 1, O.
Morgan Construction Co.,
Worcester 5, Mass.
Morgan Engineering Co., The,
Alliance, O.
Morgan Lumber Sales Co.,
8 E. Long St., Columbus, O.
Morton Salt Co.,
310 S. Michigan Ave.,
Chicago 4, Ill.
Motor Products Corp., Deep Freeze
Div., 2309-7 Davis St.,
N. Chicago, Ill.
Muehlhausen Spring Corp.,
921 Michigan Ave.,
Logansport, Ind.
Mullins Mfg. Co.,
Warren, O.
Murchey Machine & Tool Co.,
Dept. L, 951 Porter St.,
Detroit 26, Mich.

N

National Acme Co., The,
170 E. 131st St., Cleveland 8, O.
National Annealing Box Co.,
Washington, Pa.
National Bearing Div., American
Brake Shoe Co., 4930 Manchester
Ave., St. Louis 10, Mo.
National Broach & Machine Co.,
5600 St. Jean Ave.,
Detroit 13, Mich.
National Carbon Co.,
30 East 42nd St.,
New York 17, N. Y.
National City Bank,
Euclid Ave. & E. 6th St.,
Cleveland 14, O.
National Fireproofing Corp.,
202 E. Ohio St.,
Pittsburgh 12, Pa.
National Forge & Ordnance Co.,
Irvine, Warren Co., Pa.
National Foundry Sand Co.,
2970 W. Grand Blvd.,
Detroit 2, Mich.
National Lead Co.,
111 Broadway, New York 6, N. Y.
National Machinery Co., The,
Tiffin, O.
National Refining Co., The,
Hanna Bldg., Cleveland 15, O.
National Screw & Mfg. Co., The,
2440 E. 75th St., Cleveland 4, O.
National Standard Co.,
Niles, Mich.
National Steel Corp.,
Grant Bldg., Pittsburgh 19, Pa.
National Tool Co., The,
11200 Madison Ave.,
Cleveland 2, O.
National Tube Co.,
Pittsburgh 30, Pa.
Nelson Specialty Welding Equip-
ment Corp., 440 Peralta St.,
San Leandro, Cal.
New Britain Machine Co.,
New Britain, Conn.
New Departure Div., General Mo-
tors Corp., Bristol, Conn.
New Jersey Zinc Co., The,
160 Front St., New York 7, N. Y.
New York & New Jersey Lubricant
Co., 292 Madison Ave.,
New York 17, N. Y.
Niagara Blower Co.,
6 E. 45th St., New York 17, N. Y.
Niagara Machine & Tool Works,
637-697 Northland Ave.,
Buffalo 11, N. Y.
Nichols, W. H., & Sons,
48 Woerd Ave.,
Waltham 54, Mass.
Nilson, A. H., Machine Co., The,
1525 Railroad St.,
Bridgeport 5, Conn.
Nitralloy Corp., The,
230 Park Ave.,
New York 17, N. Y.
Norma-Hoffmann Bearings Corp.,
Stamford, Conn.
Northwest Engineering Co.,
28 W. Jackson Blvd.,
Chicago 4, Ill.
Norton Co.,
Worcester 6, Mass.

Nox-Rust Corp.,
2431 S. Halsted St.,
Chicago 8, Ill.

O

Oakite Products, Inc.,
30H Thames St.,
New York 6, N. Y.
Ohio Crankshaft Co., The,
3800 Harvard Ave.,
Cleveland 1, O.
Ohio Electric Mfg. Co., The,
5906 Maurice Ave.,
Cleveland 4, O.
Ohio Galvanizing & Mfg. Co.,
Penn St., Niles, O.
Ohio Locomotive Crane Co.,
Bucyrus, O.
Ohio Machine Tool Co., The,
Kenton, O.
Ohio Seamless Tube Co.,
Shelby, O.
Ohio Steel Foundry Co.,
Lima, and Springfield, O.
Oiljak Mfg. Co., Inc.,
18 Depot Square, Montclair, N. J.
Oliver Iron & Steel Corp.,
S. 10th & Muriel Sts.,
Pittsburgh 3, Pa.
O'Neil-Irwin Mfg. Co.,
304 8th Ave. S.,
Minneapolis 15, Minn.
Osgood Co., The,
Marion, O.
Oster Mfg. Co.,
2037 E. 61st Place,
Cleveland 3, O.
Otis Elevator Co.,
260 11th Ave., New York 1, N. Y.
Owen Bucket Co.,
6013 Breakwater Ave.,
Cleveland 2, O.
Owens-Corning Fiberglas Corp.,
Nicholas Bldg., Toledo 1, O.
Ozalid Products Div. General Aniline & Film Corp.,
Johnson City, N. Y.

P

Page Steel & Wire Div., American Chain & Cable Co. Inc.,
Monessen, Pa.
Palmer-Shile Co.,
7100 W. Jefferson Ave.,
Detroit 17, Mich.
Pangborn Corp.,
Hagerstown, Md.
Parish Pressed Steel Co.,
Reading, Pa.
Parker Appliance Co., The,
17325 Euclid Ave.,
Cleveland 12, O.
Parker-Kalon Corp.,
200 Varick St.,
New York 14, N. Y.
Parker Rust Proof Co.,
2158 E. Milwaukee Ave.,
Detroit 11, Mich.
Parkin, Wm. M., Co., The,
Highland Bldg., Pittsburgh 6, Pa.
Pawtucket Mfg. Co.,
327 Pine St., Pawtucket, R. I.
Paxson Machine Co.,
Benton Rd., Salem, O.
Peninsular Grinding Wheel Co.,
729 Meldrum Ave.,
Detroit 7, Mich.
Pennsylvania Flexible Metallic Tubing Co., 7250 Powers Lane,
Philadelphia 42, Pa.
Pennsylvania Industrial Engineers, Div. Union Mining Co.,
2413 W. Magnolia St.,
Pittsburgh 12, Pa.
Pennsylvania Salt Mfg. Co.,
1000 Widener Bldg.,
Philadelphia 7, Pa.
Penola, Inc.
34th & Smallman Sts.,
Pittsburgh 1, Pa.
Perkins, B. F., & Son, Inc.,
Holyoke, Mass.
Permold Co., The,
830 W. Liberty St., Medina, O.
Pesco Products Co.,
11610 Euclid Ave.,
Cleveland 6, O.
Philadelphia Gear Works,
Erie Ave. & G St.,
Philadelphia 34, Pa.
Philco Corp. Storage Battery Div.,
467 Calhoun St., Trenton 7, N. J.
Phillips Screw Manufacturers,
Providence, R. I.
Phoenix Mfg. Co.,
332 S. Michigan Ave.,
Chicago 4, Ill.
Pickands Mather & Company,
Union Commerce Bldg.,
Cleveland 14, O.
Pines Engineering Co.,
600 Prairie St., Aurora, Ill.
Pittsburgh Commercial Heat Treating Co., 49th St. & A. V. R. R.,
Pittsburgh 1, Pa.
Pittsburgh Crushed Steel Co.,
4839 Harrison St.,
Pittsburgh 1, Pa.
Pittsburgh Gear & Machine Co.,
2580-2700 Smallman St.,
Pittsburgh 22, Pa.
Pittsburgh Lectromelt Furnace Corp.,
P. O. Box 1257, Pittsburgh 30, Pa.
Pittsburgh Plate Glass Co., Brush Div., 3221 Frederick Ave.,
Baltimore 29, Md.
Pittsburgh Plate Glass Co., Paint Div., 632 Duquesne Way,
Pittsburgh 22, Pa.
Pittsburgh Rolls Corp.,
41st & Willow Sts.,
Pittsburgh 1, Pa.
Pittsburgh Steel Co.,
1643 Grant Bldg.,
Pittsburgh 30, Pa.
Pittsburgh Steel Foundry Corp.,
Glassport, Pa.
Plan-O-Mill Corp.,
1511 E. Eight Mile Rd.,
Hazel Park, Mich.
Plymouth Locomotive Works Div., Fate-Root-Heath Co.,
Plymouth, O.
Pollak Mfg. Co.,
541 Devin St., Arlington, N. J.
Poole Fdry. & Machine Co.,
Woodberry, Baltimore 11, Md.
Porter, H. K., Inc.,
401 Ashland St., Everett, Mass.
Porter, H. K. Co., Inc.,
49th & Harrison Sts.,
Pittsburgh 1, Pa.
Poulsen & Nardon, Inc.,
2665 Leonis Blvd.,
Los Angeles 11, Cal.
Pressed Steel Car Co. Inc.,
Grant Bldg., Pittsburgh 19, Pa.
Progressive Welder Co.,
3050 E. Outer Drive,
Detroit 12, Mich.
Protectoseal Co.,
1920 S. Western Ave.,
Chicago 8, Ill.
Purdy, A. R., Co.,
790 Greenwich St.,
New York 14, N. Y.

R

R-S Products Corp.,
122 Berkley St.,
Philadelphia 44, Pa.
Ransohoff, N. Inc.,
1317 Township Ave.,
Cincinnati 16, O.
Rapids Standard Co., Inc., The,
Peoples Nat'l Bank Bldg.,
Grand Rapids 2, Mich.
Rathborne, Hair & Ridgway Co.,
1440 W. 21st Place,
Chicago 8, Ill.
Raymond Mfg. Co., Div. Associated Spring Corp.,
280 S. Centre St., Corry, Pa.
Reading Chain & Block Corp.,
2102 Adams St., Reading, Pa.
Ready-Power Co., The,
3842 Grand River Ave.,
Detroit 8, Mich.
Redford Engineering Co.,
21200 E. Eight Mile Rd.,
Detroit 19, Mich.
Reeves Steel & Mfg. Co.,
Dover, O.
Reid-Avery Co., The,
Cleveland & Chesapeake Sts.,
Baltimore 22, Md.
Reid Brothers Co., Inc.,
140 Elliott St., Beverly, Mass.
Reliable Spring & Wire Forms Co.,
3167 Fulton Rd., Cleveland 9, O.
Reliance Electric & Engineering Co., 1088 Ivanhoe Rd.,
Cleveland 10, O.
Remington Rand Inc., Systems Div.,
415 Fourth Ave.,
New York 10, N. Y.
Remmey, Richard C., Son Co.,
Hedley St. & Delaware River,
Philadelphia 37, Pa.
Republic Drill & Tool Co.,
322 S. Green St., Chicago 7, Ill.
Republic Steel Corp.,
Dept. ST, Cleveland 4, O.
Revere Copper & Brass, Inc.,
230 Park Ave.,
New York 17, N. Y.
Revolvator Co.,
391 86th St., North Bergen, N. J.
Reynolds Metals Co.,
2500 S. Third St.,
Louisville 1, Ky.
Rheem Research Products, Inc.,
206 Standard Oil Bldg.,
Baltimore 2, Md.
Rhoades, R. W., Metaline Co. Inc.,
50-17 Fifth St.,
Long Island City 1, N. Y.
Richards, G. Whitfield,
1738 Carlton St.,
Philadelphia 2, Pa.
Riehle Testing Machine Div. American Machine & Metals, Inc.,
E. Moline, Ill.
Robins Conveyors, Inc.,
270 Passaic Ave., Passaic, N. J.
Rockford Machine Tool Co.,
2400 Kishwaukee St.,
Rockford, Ill.
Roebling's, John A., Sons Co.,
Trenton 2, N. J.
Rollway Bearing Co., Inc.,
541 Seymour St.,
Syracuse 4, N. Y.
Rolock, Inc.,
1350 Kings Highway,
Fairfield, Conn.
Roper, Geo. D., Corp., The,
Rockford, Ill.
Ross Carrier Corp.,
Benton Harbor, Mich.
Ross Heater & Mfg. Co. Inc.,
1431 West Ave., Buffalo 15, N. Y.
Ruemelin Mfg. Co.,
3882 N. Palmer Ave.,
Milwaukee 12, Wis.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Rustless Iron & Steel Corp.,
3400 E. Chase St.,
Baltimore 13, Md.
Ryerson, Jos. T., & Son, Inc.,
16th & Rockwell Sts.,
Chicago 80, Ill.

S

S K F Industries, Inc.,
Front St. & Erie Ave.,
Philadelphia 34, Pa.
Safety Grinding Wheel & Machine Co., P. O. Box 746, Springfield, O.
Saginaw Malleable Iron Div., General Motors Corp., Saginaw, Mich.
Salem Engineering Co.,
714 S. Broadway, Salem, O.
Samuel, Frank, & Co. Inc.,
15th & Market Sts.,
Philadelphia 2, Pa.
Sandvik Steel, Inc.,
111 Eighth Ave.,
New York 11, N. Y.
Scaife Co.,
Ann St., Oakmont, Pa.
Scherr, George, Co.,
202 Lafayette St.,
New York 12, N. Y.
Schloemann Engineering Corp.,
1105 Empire Bldg.,
Pittsburgh 22, Pa.
Schneible, Claude B., Co.,
2827 25th St., Detroit 16, Mich.
Sciaky Bros.,
4915 W. 67th St., Chicago 38, Ill.
Scovill Mfg. Co.,
20 Mill St., Waterbury 91, Conn.
Scully-Jones & Co.,
1901 S. Rockwell St.,
Chicago 8, Ill.
Seneca Wire & Mfg. Co., The,
Fostoria, O.
Seymour Mfg. Co., The,
51 Franklin St., Seymour, Conn.
Shafer Bearing Corp.,
1418 W. Washington Blvd.,
Chicago 7, Ill.
Shawinigan Products Corp.,
Empire State Bldg.,
New York 1, N. Y.
Sheffield Corp., The,
721 Springfield St., Dayton 1, O.
Shell Oil Co., Inc.,
50 W. 50th St.,
New York 20, N. Y.
Shenango-Penn Mold Co.,
Oliver Bldg., Pittsburgh 22, Pa.
Shenango-Penn Mold Co., Bronze Dept., 444 W. Third, Dover, O.
Shepard Niles Crane & Hoist Corp.,
358 Schuyler Ave.,
Montour Falls, N. Y.
Shuster, F. B., Mfg. Co., Inc., The,
New Haven 9, Conn.
Siefen, J. J. Co.,
5657 Lauderdale Ave.,
Detroit 9, Mich.
Siewek Tool Co. Div. Domestic Industries, Inc., 231 S. La Salle St.,
Chicago 4, Ill.
Silent Hoist & Crane Co.,
849 63rd St., Brooklyn 20, N. Y.
Simmons Machine Tool Corp.,
1755 N. Broadway,
Albany 1, N. Y.
Simonds Gear & Mfg. Co., The,
25th St., Pittsburgh 22, Pa.
Simonds Saw & Steel Co.,
1350 Columbia Rd.,
Boston 27, Mass.
Simonds Worden White Co.,
714 Negley Place, Dayton 7, O.
Sinclair Refining Co.,
630 Fifth Ave.,
New York 20, N. Y.
SisalKraft Co., The,
205 W. Wacker Dr.,
Chicago 6, Ill.
Snyder Tool & Engineering Co.,
3400 E. Lafayette Ave.,
Detroit 7, Mich.
Socony-Vacuum Oil Co. Inc.,
26 Broadway, New York 4, N. Y.
South Bend Lathe Works,
429 Madison St.,
South Bend 22, Ind.
Southern Ferro Alloys Co.,
2108 Chestnut St.,
Chattanooga 2, Tenn.
Spe-D-Cut Tool Co.,
Hannibal, Mo.
Square D Co.,
4041 N. Richards St.,
Milwaukee 12, Wis.
Standard Products Co., The,
Boulevard Bldg., Detroit 2, Mich.
Standard Steel Works Div. of the Baldwin Locomotive Works, Paschall P. O., Philadelphia 42, Pa.
Standard Tube Co., The,
14600 Woodward Ave.,
Detroit 3, Mich.
Standard Varnish Works,
2600 Richmond Terrace,
Staten Island 3, N. Y.
Stanley Works, The,
New Britain, & Bridgeport, Conn.
Stanwood Corp.,
4819 W. Cortland St.,
Chicago 39, Ill.
Steel and Tubes, Div. Republic Steel Corp. 226 E. 131st St.,
Cleveland 8, O.
Steel Founders' Society of America,
920 Midland Bldg.,
Cleveland 15, O.
Steel Improvement & Forge Co., The, 950 E. 64th St.,
Cleveland 14, O.
Steel Products Engineering Co., The,
1205 W. Columbia Ave.,
Springfield, O.
Sterling Bolt Co.,
209 W. Jackson Blvd.,
Chicago 6, Ill.
Sterling Grinding Wheel, The, Div. of The Cleveland Quarries Co.,
Tiffin, O.
Sticht, Herman H., Co.,
27 Park Place, New York 7, N. Y.
Stokermit Corp.,
4548 W. Mitchell St.,
Milwaukee 14, Wis.
Streeter-Amet Co.,
4103 Ravenswood Ave.,
Chicago 13, Ill.
Streine Tool & Mfg. Co., The,
New Bremen, O.
Strom Steel Ball Co.,
1850 S. 54th Ave., Cicero, Ill.
Strong Steel Foundry Co.,
Hertel & Norris Aves.,
Buffalo 7, N. Y.
Struthers Wells Corp.,
Titusville, Pa.
Stuart, D. A., Oil Co., Ltd.,
2733 S. Troy St., Chicago 23, Ill.
Sturtevant, B. F., Co.,
Hyde Park, Boston 36, Mass.
Sun Oil Co.,
Dept. 1, Philadelphia 3, Pa.
Sundstrand Machine Tool Co.,
2540 Eleventh St., Rockford, Ill.
Superior Steel Corp.,
Carnegie, Pa.
Surface Combustion Corp.,
2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp.,
P. O. Box 1888, Pittsburgh 30, Pa.
Syntron Co.,
370 Lexington Ave.,
Homer City, Pa.

T

Tate-Jones & Co., Inc.,
Leetsdale, Pa.
Taylor-Wharton Iron & Steel Co.,
Easton, Pa.
Taylor-Wilson Mfg. Co.,
15 Thomson Ave.,
McKees Rocks, Pa.
Taylor-Winfield Corp.,
Warren, O.
Texas Co., The,
135 E. 42nd St.,
New York 17, N. Y.
Thew Shovel Co., The,
Lorain, O.

Thomas Machine Mfg. Co.,
Etna Branch P. O.,
Pittsburgh 23, Pa.
Thomas Steel Co., The,
Warren, O.
Tide Water Associated Oil Co.,
17 Battery Pl., New York 4, N. Y.
Timken Roller Bearing Co., The,
Canton 6, O.
Timken Roller Bearing Co., The,
Steel & Tube Div. Canton 6, O.
Tinnerman Products, Inc.,
2039 Fulton Rd.,
Cleveland 13, O.
Titan Metal Mfg. Co.,
Bellefonte, Pa.
Titanium Alloy Mfg. Co., The,
Niagara Falls, N. Y.
Todd Steel Corp.,
370 Midland Ave.,
Detroit 3, Mich.
Toledo Stamping & Mfg. Co.,
99 Fearing Blvd., Toledo 7, O.
Tomkins-Johnson Co., The,
611 N. Mechanic St., Jackson, Mich.
Torrington Co., The,
Torrington, Conn.
Tourek, J. J., Mfg. Co.,
4701-11 W. 16th St.,
Chicago 50, Ill.
Towmotor Corp.,
1223 E. 152nd St.,
Cleveland 10, O.
Trabon Engineering Corp.,
1818 E. 40th St., Cleveland 3, O.
Trico Products Corp.,
43 Trico Sq. Buffalo 3, N. Y.
Triplex Screw Co.,
5341 Grant Ave., Cleveland 5, O.
Trundle Engineering Co., The,
Bulkley Bldg., Cleveland 15, O.
Tube Reducing Corp.,
Wallington, N. J.
Tube Turns, Inc.,
224 E. Broadway,
Louisville 1, Ky.
Tung-Tip Tools Div., Lowell & Grayson, Monrovia, Cal.
Turco Products, Inc.,
6135 S. Central Ave.,
Los Angeles 54, Cal.
Turner Gauge Grinding Co.,
2625 Hilton Rd.,
Ferndale 20, Mich.
Twin Disc Clutch Co.,
1379 Racine Ave., Racine, Wis.

U

Udylite Corp., The,
1651 E. Grand Blvd.,
Detroit 11, Mich.
Union Asbestos & Rubber Co.,
1821 S. 54th Ave., Cicero 50, Ill.
Union Chain & Mfg. Co.,
Sandusky, O.
Union Drawn Steel Co.,
Massillon, O.
Union Steel Castings Div. of Blaw-Knox Co., Pittsburgh 1, Pa.
Union Wire Rope Corp.,
21st St. & Manchester Ave.,
Kansas City 3, Mo.
United Autographic Register Co.,
5000 S. California Ave.,
Chicago 32, Ill.
United Chromium, Inc.,
51 E. 42nd St.,
New York 17, N. Y.
United Engineering & Foundry Co.,
1st Nat'l Bank Bldg.,
Pittsburgh 22, Pa.
U. S. Automatic Corp.,
Amherst, O.
United States Graphite Co., The,
Saginaw, Mich.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave.,
New York 20, N. Y.
United States Steel Supply Co.,
P. O. Box MM, Chicago 90, Ill.
United States Steel Corp.,
436—7th Ave., Pittsburgh 30, Pa.
Universal Engineering Co.,
Frankenmuth, Mich.

V

Valley Mould & Iron Co.,
Hubbard, O.
Vanadium-Alloys Steel Co.,
Latrobe, Pa.
Van der Horst Corp. of America,
12500 Berea Rd.,
Cleveland 11, O.
Van Dorn Iron Works Co.,
2685 E. 79th St., Cleveland 4, O.
Vascoloy-Ramet Corp.,
N. Chicago, Ill.
Vaughn Machinery Co.,
Cuyahoga Falls, O.
Veeder-Root, Inc.,
Hartford 2, Conn.
Verd-A-Ray Corp.,
615 Front St., Toledo 5, O.
Vickers, Inc.,
1480 Oakman Blvd.,
Detroit 32, Mich.
Victor Equipment Co.,
844-54 Folsom St.,
San Francisco 7, Cal.
Vinco Corp.,
Schaefer & Joy Roads,
Detroit 27, Mich.
Vulcan Iron Works,
Wilkes Barre, Pa.

W

Waldron, John, Corp.,
New Brunswick, N. J.
E. R. Wagner Mfg. Co.,
4615 N. 32nd St.,
Milwaukee 9, Wis.
Wales-Strippit Corp.,
385 Payne Ave.,
N. Tonawanda, N. Y.
Walker-Turner Co. Inc.,
4550 Berckman St.,
Plainfield, N. J.
Ward Leonard Electric Co.,
65 South St., Mt. Vernon, N. Y.
Ward Steel Co.,
44 Farnsworth St.,
Boston 10, Mass.
Warner & Swasey Co.,
5701 Carnegie Ave.,
Cleveland 3, O.
Washburn Wire Co.,
118th St. & Harlem River,
New York 35, N. Y.
Watson-Stillman Co.,
Roselle, N. J.
Wean Engineering Co., Inc., The,
Warren, O.
Weatherhead Co., The,
300 E. 131st St., Cleveland 8, O.
Webb Corp., The,
417 E. Broadway, Webb City, Mo.
Weinman Pump & Supply Co., The,
207-209 Blvd. of the Allies,
Pittsburgh 22, Pa.
Weirton Steel Co.,
Weirton, W. Va.
Wellman Bronze & Aluminum Co.,
2539 E. 93rd St., Cleveland 4, O.
Wells Mfg. Co.,
1515 Fillmore St.,
Three Rivers, Mich.
Wesche, B. A., Electric Co., The,
1628 Vine St., Cincinnati 10, O.
West Penn Machinery Co.,
1208 House Bldg.,
Pittsburgh 22, Pa.
Western Brass Mills Div. of Olin Industries, E. Alton, Ill.
Westinghouse Electric Corp.,
Dept. 7-N, E. Pittsburgh, Pa.
Wheeling Steel Corp.,
Wheeling, W. Va.
Whitcomb Locomotive Co.,
Rochelle, Ill.
Whitehead Stamping Co.,
1661 W. Lafayette Blvd.,
Detroit 16, Mich.
Wickes Brothers,
Saginaw, Mich.
Wickwire Brothers, Inc.,
189 Main St., Cortland, N. Y.
Wickwire Spencer Steel Co.,
500 Fifth Ave.,
New York 18, N. Y.
Wilkens-Anderson Co.,
111 N. Canal St., Chicago 6, Ill.
Williams, J. H., & Co.,
400 Vulcan St., Buffalo 7, N. Y.
Willson Products, Inc.,
2nd & Washington Sts.,
Reading, Pa.
Wilson, Lee, Engineering Co.,
20005 Lake Road,
Cleveland 16, O.
Wisconsin Motor Corp.,
Milwaukee 14, Wis.
Wisconsin Steel Co.,
180 N. Michigan Ave.,
Chicago 1, Ill.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Wolverine Tube Div., Calumet & Hecla Consolidated Copper Co.,
1411 Central Ave.,
Detroit 9, Mich.
Wood, R. D., Co.,
400 Chestnut St.,
Philadelphia 5, Pa.
Wood Shovel & Tool Co.,
Piqua, O.
Woodworth, N. A., Co.,
1300 E. Nine Mile Rd.,
Detroit 20, Mich.
Worcester Pressed Steel Co.,
508 Barber Ave.,
Worcester 6, Mass.
Worth Steel Co.,
Claymont, Del.
Wright Mfg. Div., American Chain & Cable Co.,
York, Pa.
Wright-Hibbard Industrial Electric Truck Inc., Phelps, N. Y.
Wrigley, Wm., Jr. Co.,
410 N. Michigan Ave.,
Chicago 11, Ill.
Wrought Washer Mfg. Co.,
2103 Bay St., Milwaukee 7, Wis.
Wyckoff Steel Co.,
P. O. Box 1256, Pittsburgh 22, Pa.
Wyman-Gordon Products Corp.,
Worcester, Mass.
Wyzenbeek & Staff, Inc.,
838 W. Hubbard St.,
Chicago 22, Ill.

Y

Yoder Co., The
5500 Walworth Ave.,
Cleveland 2, O.
Youngstown Sheet & Tube Co.,
Youngstown 1, O.
Youngstown Welding & Engineering Co., The, 3711 Oakwood Ave.,
Youngstown 9, O.

Z

Zeh & Hahnemann Co.,
56 Avenue A, Newark 5, N. J.
Ziv Steel & Wire Co.,
2945 W. Harrison St.,
Chicago 11, Ill.
Zurn, J. A., Mfg. Co.,
Erie, Pa.

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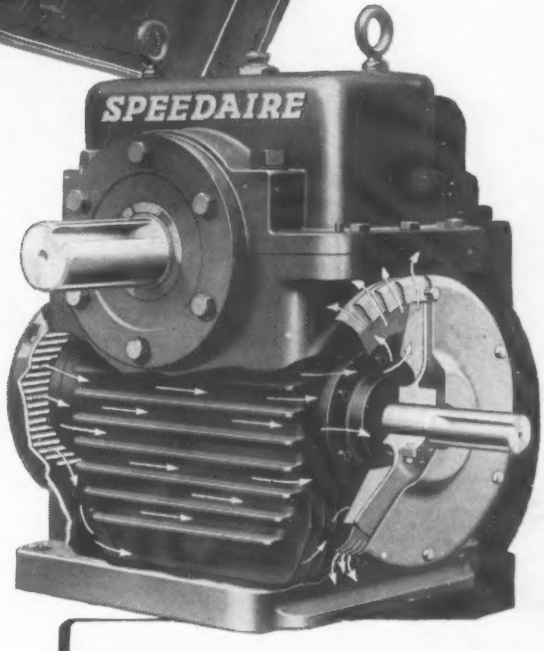

A Plant Engineer writes:—

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Cleveland **SPEEDAIRE** *Worm Gear Reduction Units*
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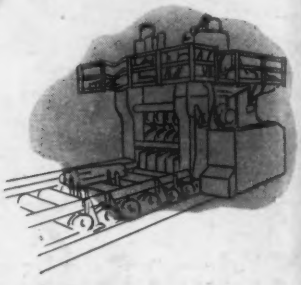
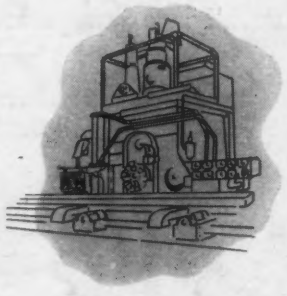


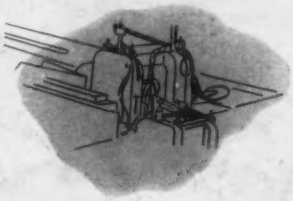
A crane reaches into a soaking pit and carefully raises an ingot of Timken Alloy Steel which has been brought to a mellow, uniform rolling temperature by precise automatic control of fuel input, time and temperature. It's placed on a buggy and started on the way to be fabricated into rounds, squares, flats or seamless tubes of the finest alloy steel money can buy.

After reaching the proper rolling temperature the ingot is sent to the 35 inch mill where by careful pass design it is uniformly worked and accurately reduced to a bloom. The bloom is then surface conditioned by grinding, hand or machine chipping. After thorough inspection, the bloom is reheated and sent to the 28, 22 or 10 inch mill for further reduction to billets or bars. After the desired size is reached, to prevent cooling strains, flakes and to improve shearing and other qualities, the billets are cooled in pyrometer equipped cooling pits.

During the rolling process many other control measures are exercised. Pickle tests are made to facilitate surface inspection. The first, middle and last portion of every heat rolled is checked by chemical analysis. Skillful Rollers are alert to avoid surface injury to billets.



These are just a few of the precise and exact control measures used to obtain the superior quality of Timken Alloy Steels. They are your assurance that forged or machined parts made from Timken Alloy Steels will have strength and quality and will function satisfactorily even in the most difficult service. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio.



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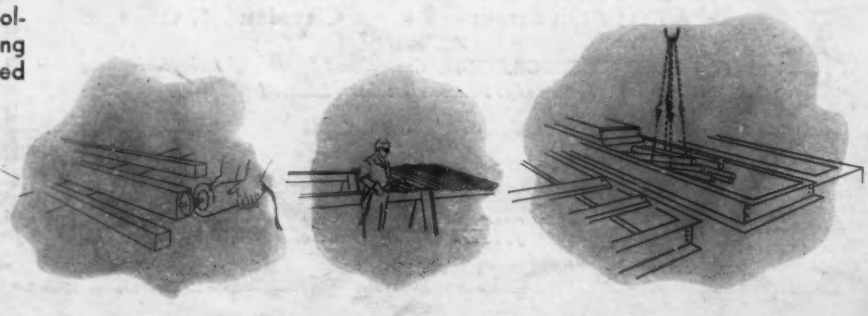
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